

## SEQUENCE LISTING

<110> INSTITUT PASTEUR  
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE - CNRS  
JESTIN, JEAN-LUC  
VICHIER-GUERRE, SOPHIE  
FERRIS, STEPHANE

<120> METHODS FOR OBTAINING THERMOSTABLE ENZYMES, DNA POLYMERASE I  
VARIANTS FROM THERMUS AQUATICUS HAVING NEW CATALYTIC ACTIVITIES,  
METHODS FOR OBTAINING THE SAME, AND APPLICATIONS OF THE SAME

<130> 266426US0XCIP - 247440/D23127

<150> US 10/787,219  
<151> 2004-02-27

<160> 106

<170> PatentIn version 3.3

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Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
20 25 30

ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
35 40 45

gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
50 55 60

gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
65 70 75

agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
80 85 90 95

ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
100 105 110

ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag 383  
Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu  
115 120 125

cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt 431  
Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu  
130 135 140

gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro 145 150 155	479
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp 160 165 170 175	527
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala 180 185 190	575
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205	623
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ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235	719
gcc gtc ctg gag gcc ctt cgc gag gcc cac ccc atc gtg gag aag atc Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255	767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att ggc ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Gly Pro 260 265 270	815
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aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300	911
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cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu	1055

340

345

350

atc cgg gtc ttc cag gag ggg cgg gat	atc cac acg gag acc gcc agc	1103
Ile Arg Val Phe Gln Glu Gly Arg Asp	Ile His Thr Glu Thr Ala Ser	
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tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg	1151	
Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg		
370	375 380	
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac	1199	
Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His		
385	390 395	
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc	1247	
Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe		
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att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag	1295	
Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu		
420	425 430	
aag acc ctg gag gag ggt agg agg cgg ggg tac gtg gag acc ctc ttc	1343	
Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe		
435	440 445	
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg	1391	
Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val		
450	455 460	
cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc cag ggc acc	1439	
Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr		
465	470 475	
gcc gcc gac ctc acg aag ctg gct atg gtg aag ctc ttc ccc agg ctg	1487	
Ala Ala Asp Leu Thr Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu		
480	485 490 495	
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc	1535	
Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val		
500	505 510	
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag	1583	
Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys		
515	520 525	
gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag	1631	
Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu		
530	535 540	
gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg gcc gca ctg	1679	

Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu  
 545 550 555

gtg ccg cgc  
 Val Pro Arg  
 560

1688

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Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
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Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
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Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
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Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
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Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
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Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
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Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
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Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
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Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Gly Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
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Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
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Gln Asn Val Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Thr Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
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Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
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Pro Arg

<210> 21  
 <211> 1688  
 <212> DNA  
 <213> *Thermus aquaticus*

<220>  
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 <222> (3)..(1688)

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 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
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 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
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 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
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 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110  
 ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag 383  
 Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu  
 115 120 125  
 cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt 431  
 Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu

130	135	140	
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cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205			623
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu 210 215 220			671
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235			719
gcc gtc ctg ggg gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc Ala Val Leu Gly Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255			767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro 260 265 270			815
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe 275 280 285			863
aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300			911
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg 305 310 315			959
gcc ttc atc gcc gag gag ggg tgg cta ttg gtg acc ctg gac tat agc Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Thr Leu Asp Tyr Ser 320 325 330 335			1007
cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg			1055

Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu		
				340					345					350			
atc	cgg	gtc	ttc	cag	gag	ggg	cgg	gac	atc	cac	acg	gag	acc	gcc	agc		1103
Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser		
			355					360					365				
tgg	atg	ttc	ggc	gtc	ccc	cgg	gag	gcc	gtg	gac	ccc	ctg	atg	cgc	cgg		1151
Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg		
			370					375				380					
gcg	gcc	aag	acc	atc	aac	ttc	ggg	gtc	ctc	tac	ggc	atg	tcg	gcc	cac		1199
Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His		
			385					390				395					
cgc	ctc	tcc	cag	gag	cta	gcc	atc	cct	tac	gag	gag	gcc	cag	gcc	ttc		1247
Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe		
			400				405				410				415		
att	gag	cgc	tac	ttt	cag	agc	ttc	ccc	aag	gtg	cgg	gcc	tgg	att	gag		1295
Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu		
				420				425						430			
aag	acc	ctg	gag	gag	ggc	agg	agg	cgg	ggg	tac	gtg	gag	acc	ctc	ttc		1343
Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe		
			435					440					445				
ggc	cgc	cgc	cgc	tac	gtg	cca	gac	cta	gag	gcc	cgg	gtg	aag	agc	gtg		1391
Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	Lys	Ser	Val		
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cgg	gag	gcg	gcc	gag	cgc	atg	gcc	ttc	aac	atg	ccc	gtc	cag	ggc	acc		1439
Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr		
			465					470				475					
gcc	gcc	gac	ctc	atg	aag	ctg	gct	atg	gtg	aag	ctc	ttc	ccc	agg	ctg		1487
Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu		
					485					490					495		
gag	gaa	atg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac	gag	ctg	gtc		1535
Glu	Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val		
				500					505					510			
ctc	gag	gcc	cca	aaa	gag	ggg	gcg	gag	gcc	gtg	gcc	cgg	ctg	gcc	aag		1583
Leu	Glu	Ala	Pro	Lys	Glu	Gly	Ala	Glu	Ala	Val	Ala	Arg	Leu	Ala	Lys		
			515					520					525				
gag	gtc	atg	gag	ggg	gtg	tat	ccc	ctg	gcc	gtg	ccc	ctg	gag	gtg	gag		1631
Glu	Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu		
			530					535				540					

gtg ggg ata ggg gag gac agg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
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gtg ccg cgc 1688  
 Val Pro Arg  
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 <213> Thermus aquaticus

<400> 22

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Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
                     35                    40                    45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
     50                    55                    60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65                    70                    75                    80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
                     85                    90                    95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
                     100                    105                    110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
                     115                    120                    125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
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Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Gly Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Thr Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val



545                      550                      555                      560

Pro Arg

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<211> 1688
<212> DNA
<213> Thermus aquaticus
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<220>
<221> CDS
<222> (3)..(1688)
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Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro	
145 150 155	
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac	52 7
Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp	
160 165 170 175	
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc	57 5
Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala	
180 185 190	
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc caa ctc	62 3
Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Gln Leu	
195 200 205	
aac caa cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt	67 1
Asn Gln Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu	
210 215 220	
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc	71 9
Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala	
225 230 235	
gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc	76 7
Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile	
240 245 250 255	
ctg cag tac cgg gag ctc aac aag ctg aag agc acc caa att act cag	81 5
Leu Gln Tyr Arg Glu Leu Asn Lys Leu Lys Ser Thr Gln Ile Thr Gln	
260 265 270	
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc	86 3
Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe	
275 280 285	
aac cag acg gcc acg caa acg ggc agg cta agt agc tcc cag ccc aac	91 1
Asn Gln Thr Ala Thr Gln Thr Gly Arg Leu Ser Ser Ser Gln Pro Asn	
290 295 300	
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg	95 9
Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg	
305 310 315	
acc ttc atc gcc gag gag ggg agg cta ttg gtg gcc ctg gac tat aac	100 7
Thr Phe Ile Ala Glu Glu Gly Arg Leu Leu Val Ala Leu Asp Tyr Asn	
320 325 330 335	

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tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg 370 375 380	1151
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His 385 390 395	1199
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe 400 405 410 415	1247
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aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe 435 440 445	1343
ggc cgc cgc cgc tac ctg cca gac cta gag gcc cag gtg aag aat gtg Gly Arg Arg Arg Tyr Leu Pro Asp Leu Glu Ala Gln Val Lys Asn Val 450 455 460	1391
cgg gag gcg gcc gag cgc agg gcc ttc aac atg ccc gtc cag ggc acc Arg Glu Ala Ala Glu Arg Arg Ala Phe Asn Met Pro Val Gln Gly Thr 465 470 475	1439
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu 480 485 490 495	1487
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val 500 505 510	1535
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys 515 520 525	1583
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gtg ccg cgc 1688  
 Val Pro Arg  
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Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
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Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
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Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Gln Leu Asn  
 195 200 205

Gln Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Asn Lys Leu Lys Ser Thr Gln Ile Thr Gln Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Gln Thr Gly Arg Leu Ser Ser Ser Gln Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Thr  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Arg Leu Leu Val Ala Leu Asp Tyr Asn Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile

340

345

350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Leu Pro Asp Leu Glu Ala Gln Val Lys Asn Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Arg Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
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Pro Arg

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 <212> DNA  
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<220>  
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 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
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 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
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 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
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 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
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 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
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 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
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 Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu  
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cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu 130 135 140	431
gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro 145 150 155	479
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp 160 165 170 175	527
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala 180 185 190	575
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205	623
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu 210 215 220	671
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235	719
gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255	767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro 260 265 270	815
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe 275 280 285	863
aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300	911
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg 305 310 315	959
gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser 320 325 330 335	1007



cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg	1055
Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu	
340 345 350	
atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag acc gcc agc	1103
Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser	
355 360 365	
tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg	1151
Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg	
370 375 380	
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac	1199
Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His	
385 390 395	
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc	1247
Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe	
400 405 410 415	
att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag	1295
Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu	
420 425 430	
aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc	1343
Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe	
435 440 445	
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg	1391
Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val	
450 455 460	
cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc cag ggc acc	1439
Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr	
465 470 475	
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg	1487
Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu	
480 485 490 495	
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc	1535
Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val	
500 505 510	
ctc gag gcc cca aaa gag agg gcg gag gcc gtg gcc cgg ctg gcc aag	1583
Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys	
515 520 525	
gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag	1631
Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu	

530

535

540

gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
 Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu  
 545 550 555

gtg ccg cgc 1688  
 Val Pro Arg  
 560

<210> 26  
 <211> 562  
 <212> PRT  
 <213> Thermus aquaticus

<400> 26

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala  
 1 5 10 15

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe  
 20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu

130

135

140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 27  
 <211> 1688  
 <212> DNA  
 <213> *Thermus aquaticus*

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 27  
 cc atg gcc tct ggt ggc ggt ggc tgt ggt ggc ggt ggc agc ccc aag 47  
 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
 1 5 10 15  
 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110  
 ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag 383  
 Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu  
 115 120 125

cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu 130 135 140	431
gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro 145 150 155	479
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp 160 165 170 175	527
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala 180 185 190	575
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205	623
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu 210 215 220	671
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235	719
gtc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc Val Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255	767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro 260 265 270	815
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe 275 280 285	863
aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300	911
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg 305 310 315	959
gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser 	1007

320	325	330	335	
cag ata gag ctc agg gtg ctg gcc cac ctc Gln Ile Glu Leu Arg Val Leu Ala His Leu 340	tcc ggc gac gag aac ctg Ser Gly Asp Glu Asn Leu 350	1055		
atc cgg gtc ttc cag gag ggg cgg gac atc Ile Arg Val Phe Gln Glu Gly Arg Asp Ile 355	cac acg gag acc gcc agc His Thr Glu Thr Ala Ser 365	1103		
tgg atg ttc ggc gtc ccc cgg gag gcc gtg Trp Met Phe Gly Val Pro Arg Glu Ala Val 370	gac ccc ctg atg cgc cgg Asp Pro Leu Met Arg Arg 380	1151		
gcg gcc aag agc atc aac ttc ggg gtc ctc Ala Ala Lys Ser Ile Asn Phe Gly Val Leu 385	tac ggc atg tcg gcc cac Tyr Gly Met Ser Ala His 395	1199		
cgc ctc tcc cag gag cta gcc atc cct tac Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr 400	gag gag gcc cag gcc ttc Glu Glu Ala Gln Ala Phe 410	1247		
att gag cgc tac ttt cag agc ttc ccc aag Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys 420	gtg cgg gcc tgg att gag Val Arg Ala Trp Ile Glu 430	1295		
aag acc ctg gag gag ggc agg agg cgg ggg Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly 435	tac gtg gag acc ctc ttc Tyr Val Glu Thr Leu Phe 445	1343		
ggc cgc cgc cgc tac gtg cca gac cta gag Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu 450	gcc cgg gtg aag agc gtg Ala Arg Val Lys Ser Val 460	1391		
cgg gag gcg gcc gag cgc atg gcc ttc aac Arg Glu Ala Ala Glu Arg Met Ala Phe Asn 465	atg ccc gtc cag ggc acc Met Pro Val Gln Gly Thr 475	1439		
gcc gcc gac ctc atg aag ctg gct atg gtg Ala Ala Asp Leu Met Lys Leu Ala Met Val 480	aag ctc tcc ccc agg ctg Lys Leu Ser Pro Arg Leu 490	1487		
gag gaa atg ggg gcc agg atg ctc ctt cag Glu Glu Met Gly Ala Arg Met Leu Leu Gln 500	gtc cac gac gag ctg gtc Val His Asp Glu Leu Val 510	1535		
ctc gag gcc cca aaa gag ggg gcg gag gcc Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala 515	gtg gcc cgg ctg gcc aag Val Ala Arg Leu Ala Lys 525	1583		
gag gtc atg gag ggg gtg tat ccc ctg gcc gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag		1631		

Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu  
 530 535 540

gtg ggg ata ggg gag gac cgg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
 Val Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu  
 545 550 555

gtg ccg cgc 1688  
 Val Pro Arg  
 560

<210> 28  
 <211> 562  
 <212> PRT  
 <213> Thermus aquaticus

<400> 28

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala  
 1 5 10 15

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe  
 20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
 100 105 110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
 115 120 125



Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Val  
225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Ser Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Ser Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 29  
 <211> 1688  
 <212> DNA  
 <213> *Thermus aquaticus*

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 29  
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 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
 1 5 10 15  
 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110  
 ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag 383  
 Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu

115	120	125	
cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu 130 135 140			431
gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro 145 150 155			479
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp 160 165 170 175			527
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala 180 185 190			575
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205			623
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu 210 215 220			671
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235			719
gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255			767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro 260 265 270			815
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe 275 280 285			863
aac cag acg gtc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Val Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300			911
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg 305 310 315			959
gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc			1007

Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser	
320 325 330 335	
cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg	1055
Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu	
340 345 350	
atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag acc gcc agc	1103
Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser	
355 360 365	
tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg	1151
Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg	
370 375 380	
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac	1199
Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His	
385 390 395	
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc	1247
Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe	
400 405 410 415	
att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag	1295
Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu	
420 425 430	
aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc	1343
Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe	
435 440 445	
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg	1391
Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val	
450 455 460	
cgg gag gcg gcc gag cgc atg gcc tac aac atg ccc gtc cag gcc acc	1439
Arg Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val Gln Gly Thr	
465 470 475	
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg	1487
Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu	
480 485 490 495	
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc	1535
Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val	
500 505 510	
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag	1583
Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys	
515 520 525	

gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag 1631  
 Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu  
           530                                  535                                  540

gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
 Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu  
           545                                  550                                  555

gtg ccg cgc 1688  
 Val Pro Arg  
 560

<210> 30  
 <211> 562  
 <212> PRT  
 <213> Thermus aquaticus

<400> 30

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala  
 1                  5                                  10                                  15

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe  
                   20                                  25                                  30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
           35                                  40                                  45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
           50                                  55                                  60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65                                  70                                  75                                  80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
                   85                                  90                                  95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
           100                                  105                                  110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
           115                                  120                                  125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Val Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val



530

535

540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 31  
 <211> 1688  
 <212> DNA  
 <213> *Thermus aquaticus*

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 31  
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 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
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 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110  
 ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag 383

Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	
		115						120					125			
cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	ggg	agg	ctt	431
Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	
		130					135					140				
gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	gag	agg	ccc	479
Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	
	145					150					155					
ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	cgc	ctg	gac	527
Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	
160					165					170					175	
gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	gag	atc	gcc	575
Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	
				180					185					190		
cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	ttc	aac	ctc	623
Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	
			195					200					205			
aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	cta	ggg	ctt	671
Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	Leu	Gly	Leu	
		210					215					220				
ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	acc	agc	gcc	719
Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	
	225					230					235					
gcc	gtc	ctg	gag	gcc	ctc	cgc	gag	gcc	cac	ccc	atc	gtg	gag	aag	atc	767
Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	
240					245					250					255	
ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac	att	gac	ccc	815
Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	
				260				265						270		
ttg	ccg	gac	ctc	atc	cac	ccc	agg	acg	ggc	cgc	ctc	cac	acc	cgc	ttc	863
Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	
			275					280					285			
aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc	gat	ccc	aac	911
Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	
		290					295					300				
ctc	cag	aac	atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg	atc	cgc	cgg	959
Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	
	305					310					315					

gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc	1007
Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser	
320 325 330 335	
cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg	1055
Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu	
340 345 350	
atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag acc gcc agc	1103
Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser	
355 360 365	
tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg	1151
Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg	
370 375 380	
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac	1199
Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His	
385 390 395	
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc	1247
Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe	
400 405 410 415	
att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag	1295
Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu	
420 425 430	
aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc	1343
Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe	
435 440 445	
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg	1391
Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val	
450 455 460	
cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc cag ggc acc	1439
Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr	
465 470 475	
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg	1487
Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu	
480 485 490 495	
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc	1535
Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val	
500 505 510	
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag	1583
Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys	
515 520 525	

gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gtg gag 1631  
 Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu  
           530                                  535                                  540

gtg ggg ata ggg gag gac cgg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
 Val Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu  
           545                                  550                                  555

gtg ccg cgc 1688  
 Val Pro Arg  
 560

<210> 32  
 <211> 562  
 <212> PRT  
 <213> Thermus aquaticus

<400> 32

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala  
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe  
           20                                  25                                  30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
           35                                  40                                  45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
           50                                  55                                  60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65                                  70                                  75                                  80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
           85                                  90                                  95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
           100                                  105                                  110

Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
           115                                  120                                  125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln

325

330

335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 33  
 <211> 1688  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 33  
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 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
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 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac ccg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg ccg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110

ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu 115 120 125	383
cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu 130 135 140	431
gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro 145 150 155	479
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp 160 165 170 175	527
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala 180 185 190	575
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu 195 200 205	623
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu 210 215 220	671
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala 225 230 235	719
gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile 240 245 250 255	767
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro 260 265 270	815
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe 275 280 285	863
aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn 290 295 300	911
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg 305 310 315	959



gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser 320 325 330 335	1007
cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu 340 345 350	1055
atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag acc gcc agc Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser 355 360 365	1103
tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg 370 375 380	1151
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His 385 390 395	1199
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe 400 405 410 415	1247
att gag cgc tac ttt ctg agc ttc ccc aag gtg cgg gcc tgg att gag Ile Glu Arg Tyr Phe Leu Ser Phe Pro Lys Val Arg Ala Trp Ile Glu 420 425 430	1295
aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe 435 440 445	1343
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gtg Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val 450 455 460	1391
cgg gag gcg gcc gag cgc aag gcc ttc aac atg ccc gtc cag ggc acc Arg Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val Gln Gly Thr 465 470 475	1439
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu 480 485 490 495	1487
gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac gag ctg gtc Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val 500 505 510	1535
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys	1583

515	520	525	
gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ctc ctg gag gtg gag			1631
Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Leu Leu Glu Val Glu			
530	535	540	
gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg gcc gca ctg			1679
Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu			
545	550	555	
gtg ccg cgc			1688
Val Pro Arg			
560			
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<210>	34		
<211>	562		
<212>	PRT		
<213>	Thermus aquaticus		
<400>	34		
Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala			
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Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe			
	20	25	30
Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala			
	35	40	45
Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala			
	50	55	60
Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser			
65	70	75	80
Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro			
	85	90	95
Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly			
	100	105	110
Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg			

115

120

125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Leu Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
 515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Leu Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 35  
 <211> 1688  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 35  
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 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
 1 5 10 15  
 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu  
 100 105 110

ggg	gtg	gcc	cgg	cgc	tac	ggc	ggg	gag	tgg	acg	gag	gag	gcg	ggg	gag	383
Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	Ala	Gly	Glu	
			115					120					125			
cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	ggg	agg	ctt	431
Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	Gly	Arg	Leu	
		130					135					140				
gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	gag	agg	ccc	479
Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	Glu	Arg	Pro	
	145					150					155					
ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	cgc	ctg	gac	527
Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	Arg	Leu	Asp	
160					165					170					175	
gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	gag	atc	gcc	575
Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	Glu	Ile	Ala	
			180						185					190		
cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	ttc	aac	ctc	623
Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	
		195						200					205			
aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	cta	ggg	ctt	671
Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	Leu	Gly	Leu	
		210					215					220				
ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	acc	agc	gcc	719
Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	
	225					230					235					
gcc	gtc	ctg	gag	gcc	ctc	cgc	gag	gcc	cac	ccc	atc	gtg	gag	aag	atc	767
Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	
240					245					250					255	
ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac	att	gac	ccc	815
Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	Ile	Asp	Pro	
			260						265					270		
ttg	cag	gac	ctc	atc	cac	ccc	agt	acg	ggc	cgc	ctc	cac	acc	cgc	ttc	863
Leu	Gln	Asp	Leu	Ile	His	Pro	Ser	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	
		275						280					285			
aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc	gat	ccc	aac	911
Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	
		290					295					300				
ctc	cag	aac	atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg	atc	cgc	cgg	959
Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	

305	310	315	
gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg gac tat agc Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser 320 325 330 335			1007
cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac gag aac ctg Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu 340 345 350			1055
atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag acc gcc agc Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser 355 360 365			1103
tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg atg cgc cgg Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg 370 375 380			1151
gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg tcg gcc cac Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His 385 390 395			1199
cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc cag gcc ttc Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe 400 405 410 415			1247
att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc tgg att gag Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu 420 425 430			1295
aag acc cta gag gag ggc agg agg cgg ggg tac gtg gag acc ctc ttc Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe 435 440 445			1343
ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg aag agc gag Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Glu 450 455 460			1391
cgg gag gcg gcc gag cgc atg gcc tac aac atg ccc gtc cag ggc acc Arg Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val Gln Gly Thr 465 470 475			1439
gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc ccc agg ctg Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu 480 485 490 495			1487
gag gaa atg ggg gcc cgg atg ctc ctt cag gtc cac gac gag ctg gtc Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val 500 505 510			1535
ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg ctg gcc aag			1583

Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys  
 515 520 525

gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg gag gcg gag 1631  
 Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Ala Glu  
 530 535 540

gtg ggg ata ggg gag gat tgg ctc tcc gcc aag gag gcg gcc gca ctg 1679  
 Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu  
 545 550 555

gtg ccg cgc 1688  
 Val Pro Arg  
 560

<210> 36  
 <211> 562  
 <212> PRT  
 <213> Thermus aquaticus

<400> 36

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys Ala  
 1 5 10 15

Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly Phe  
 20 25 30

Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu Ala  
 35 40 45

Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys Ala  
 50 55 60

Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu Ser  
 65 70 75 80

Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp Pro  
 85 90 95

Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu Gly  
 100 105 110



Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Gln Asp Leu Ile His Pro Ser Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Glu Arg  
450 455 460

Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val Gln Gly Thr Ala  
465 470 475 480

Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu  
515 520 525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Ala Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 37  
 <211> 1688  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (3)..(1688)

<400> 37  
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 Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly Ser Pro Lys  
 1 5 10 15  
 gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc ttc gtg ggc 95  
 Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala Phe Val Gly  
 20 25 30  
 ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt ctg gcc ctg 143  
 Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu Leu Ala Leu  
 35 40 45  
 gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag cct tat aaa 191  
 Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu Pro Tyr Lys  
 50 55 60  
 gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc aaa gac ctg 239  
 Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala Lys Asp Leu  
 65 70 75  
 agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc ggc gac gac 287  
 Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro Gly Asp Asp  
 80 85 90 95  
 ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc acc ccc gag 335  
 Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr Thr Pro Glu

100

105

110

ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag gcg ggg gag	383
Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu	
115 120 125	
cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg ggg agg ctt	431
Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu	
130 135 140	
gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg gag agg ccc	479
Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro	
145 150 155	
ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg cgc ctg gac	527
Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp	
160 165 170 175	
gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag gag atc gcc	575
Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala	
180 185 190	
cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc ttc aac ctc	623
Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu	
195 200 205	
aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag cta ggg ctt	671
Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu	
210 215 220	
ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc acc agc gcc	719
Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala	
225 230 235	
gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg gag aag atc	767
Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile	
240 245 250 255	
ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac att gac ccc	815
Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro	
260 265 270	
ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac acc cgc ttc	863
Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe	
275 280 285	
aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc gat ccc aac	911
Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn	
290 295 300	
ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg atc cgc cgg	959

Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	
305						310					315					
gcc	ttc	atc	gcc	gag	gag	ggg	tgg	cta	ttg	gtg	gcc	ctg	gac	tat	agc	1007
Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu	Asp	Tyr	Ser	
320					325					330					335	
cag	ata	gag	ctc	agg	gtg	ctg	gcc	cac	ctc	tcc	ggc	gac	gag	aac	ctg	1055
Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	
				340					345					350		
atc	cgg	gtc	ttc	cag	gag	ggg	cgg	gac	atc	cac	acg	gag	acc	gcc	agc	1103
Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	Thr	Ala	Ser	
			355					360					365			
tgg	atg	ttc	ggc	gtc	ccc	cgg	gag	gcc	gtg	gac	ccc	ctg	atg	cgc	cgg	1151
Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	
		370					375					380				
gcg	gcc	aag	acc	atc	aac	ttc	ggg	gtc	ctc	tac	ggc	atg	tcg	gcc	cac	1199
Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	
	385					390					395					
cgc	ctc	tcc	cag	gag	cta	gcc	atc	cct	tac	gag	gag	gcc	cag	gcc	ttc	1247
Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	Gln	Ala	Phe	
400					405					410					415	
att	gag	cgc	tac	ttt	cag	agc	ttc	ccc	aag	gtg	cgg	gcc	tgg	att	gag	1295
Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	
				420					425					430		
aag	acc	ctg	gag	gag	ggc	agg	agg	cgg	ggg	tac	gtg	gag	acc	ctc	ttc	1343
Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	
			435					440					445			
ggc	cgc	cgc	cgc	tac	gtg	cca	gac	cta	gag	gcc	cgg	gtg	aag	agc	gtg	1391
Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	Lys	Ser	Val	
		450					455					460				
cgg	gag	gcg	gcc	gag	cgc	atg	gcc	ttc	aac	atg	ccc	gtc	cag	ggc	acc	1439
Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	
	465					470					475					
gcc	gcc	gac	ctc	gtg	aag	ctg	gct	atg	gtg	aag	ctc	ttc	ccc	agg	ctg	1487
Ala	Ala	Asp	Leu	Val	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	
480					485				490						495	
gag	gaa	atg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac	gag	ctg	gtc	1535
Glu	Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	Glu	Leu	Val	
				500					505					510		



Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu Ala Gly Glu Arg  
 115 120 125

Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp Gly Arg Leu Glu  
 130 135 140

Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val Glu Arg Pro Leu  
 145 150 155 160

Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val Arg Leu Asp Val  
 165 170 175

Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu Glu Ile Ala Arg  
 180 185 190

Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro Phe Asn Leu Asn  
 195 200 205

Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu Leu Gly Leu Pro  
 210 215 220

Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser Thr Ser Ala Ala  
 225 230 235 240

Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val Glu Lys Ile Leu  
 245 250 255

Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr Ile Asp Pro Leu  
 260 265 270

Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His Thr Arg Phe Asn  
 275 280 285

Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn Leu  
 290 295 300

Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg Ile Arg Arg Ala  
 305 310 315 320

Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu Asp Tyr Ser Gln  
 325 330 335

Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp Glu Asn Leu Ile  
 340 345 350

Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu Thr Ala Ser Trp  
 355 360 365

Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu Met Arg Arg Ala  
 370 375 380

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met Ser Ala His Arg  
 385 390 395 400

Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala Gln Ala Phe Ile  
 405 410 415

Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala Trp Ile Glu Lys  
 420 425 430

Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu Thr Leu Phe Gly  
 435 440 445

Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val Lys Ser Val Arg  
 450 455 460

Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val Gln Gly Thr Ala  
 465 470 475 480

Ala Asp Leu Val Lys Leu Ala Met Val Lys Leu Phe Pro Arg Leu Glu  
 485 490 495

Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp Glu Leu Val Leu  
 500 505 510

Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg Leu Ala Lys Glu



515

520

525

Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu Glu Val Glu Val  
 530 535 540

Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala Ala Ala Leu Val  
 545 550 555 560

Pro Arg

<210> 39  
 <211> 12  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic Peptide

&lt;400&gt; 39

Met Ala Ser Gly Gly Gly Gly Cys Gly Gly Gly Gly  
 1 5 10

<210> 40  
 <211> 17  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic Peptide

&lt;400&gt; 40

Ala Ala Ala Leu Val Pro Arg Gly Ser Leu Glu His His His His His  
 1 5 10 15

His

<210> 41  
 <211> 22  
 <212> PRT  
 <213> Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic Peptide

&lt;400&gt; 41

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
1 5 10 15

Ala Gln Pro Ala Met Ala  
20

&lt;210&gt; 42

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic Peptide

&lt;400&gt; 42

Met Lys Thr Leu Leu Ala Met Val Leu Val Gly Leu Leu Leu Leu Pro  
1 5 10 15

Pro Gly Pro Ser Met Ala  
20

&lt;210&gt; 43

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic Peptide

&lt;400&gt; 43

Met Arg Gly Leu Leu Ala Met Leu Val Ala Gly Leu Leu Leu Leu Pro  
1 5 10 15

Ile Ala Pro Ala Met Ala  
20

&lt;210&gt; 44

<211> 22  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic Peptide

<400> 44

Met Arg Arg Leu Leu Val Ile Ala Ala Val Gly Leu Leu Leu Leu Leu  
 1 5 10 15

Ala Pro Pro Thr Met Ala  
 20

<210> 45  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Synthetic DNA

<400> 45  
 gcggccgcac tgggtgccgcg cggcagcctc gag

33

<210> 46  
 <211> 148  
 <212> PRT  
 <213> Homo sapiens

<400> 46

Ala Asp Gln Leu Thr Glu Glu Gln Ile Ala Glu Phe Lys Glu Ala Phe  
 1 5 10 15

Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr Ile Thr Thr Lys Glu Leu  
 20 25 30

Gly Thr Val Met Arg Ser Leu Gly Gln Asn Pro Thr Glu Ala Glu Leu  
 35 40 45

Gln Asp Met Ile Asn Glu Val Asp Ala Asp Gly Asn Gly Thr Ile Asp  
 50 55 60

Phe Pro Glu Phe Leu Thr Met Met Ala Arg Lys Met Lys Asp Thr Asp  
65 70 75 80

Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg Val Phe Asp Lys Asp Gly  
85 90 95

Asn Gly Tyr Ile Ser Ala Ala Glu Leu Arg His Val Met Thr Asn Leu  
100 105 110

Gly Glu Lys Leu Thr Asp Glu Glu Val Asp Glu Met Ile Arg Glu Ala  
115 120 125

Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr Glu Glu Phe Val Gln Met  
130 135 140

Met Thr Ala Lys  
145

<210> 47  
<211> 114  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic DNA

<400> 47

Gln Val Gln Leu Gln Gln Ser Gly Pro Glu Asp Val Lys Pro Gly Ala  
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr  
20 25 30

Tyr Met Asn Trp Val Lys Gln Ser Pro Gly Lys Gly Leu Glu Trp Ile  
35 40 45

Gly Asp Ile Asn Pro Asn Asn Gly Gly Thr Ser Tyr Asn Gln Lys Phe  
50 55 60

Lys Gly Arg Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr  
 65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ser Val Tyr Tyr Cys  
 85 90 95

Glu Ser Gln Ser Gly Ala Tyr Trp Gly Gln Gly Thr Thr Val Thr Val  
 100 105 110

Ser Ala

<210> 48  
 <211> 20  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic Peptide

<400> 48

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly  
 1 5 10 15

Gly Gly Gly Ser  
 20

<210> 49  
 <211> 116  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic Peptide

<400> 49

Asp Tyr Lys Asp Ile Leu Met Thr Gln Thr Pro Ser Ser Leu Pro Val  
 1 5 10 15

Ser Leu Gly Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Ile  
 20 25 30

Val His Ser Asn Gly Asn Thr Tyr Leu Glu Trp Tyr Leu Gln Lys Pro  
 35 40 45

Gly Gln Ser Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser  
 50 55 60

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr  
 65 70 75 80

Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys  
 85 90 95

Phe Gln Gly Ser His Val Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu  
 100 105 110

Glu Ile Lys Arg  
 115

<210> 50  
 <211> 291  
 <212> PRT  
 <213> Thermus thermophilus

<400> 50

Met Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val Leu Leu  
 1 5 10 15

Val Asp Gly His His Leu Ala Tyr Arg Thr Phe Phe Ala Leu Lys Gly  
 20 25 30

Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly Phe Ala  
 35 40 45

Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Tyr Lys Ala Val Phe  
 50 55 60

Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala Tyr Glu  
 65 70 75 80

Ala Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro Arg Gln  
85 90 95

Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Phe Thr Arg Leu  
100 105 110

Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Thr Leu Ala Lys  
115 120 125

Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala Asp Arg  
130 135 140

Asp Leu Tyr Gln Leu Val Ser Asp Arg Val Ala Val Leu His Pro Glu  
145 150 155 160

Gly His Leu Ile Thr Pro Glu Trp Leu Trp Glu Lys Tyr Gly Leu Arg  
165 170 175

Pro Glu Gln Trp Val Asp Phe Arg Ala Leu Val Gly Asp Pro Ser Asp  
180 185 190

Asn Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala Leu Lys Leu  
195 200 205

Leu Lys Glu Trp Gly Ser Leu Glu Asn Leu Leu Lys Asn Leu Asp Arg  
210 215 220

Val Lys Pro Glu Asn Val Arg Glu Lys Ile Lys Ala His Leu Glu Asp  
225 230 235 240

Leu Arg Leu Ser Leu Glu Leu Ser Arg Val Arg Thr Asp Leu Pro Leu  
245 250 255

Glu Val Asp Leu Ala Gln Gly Arg Glu Pro Asp Arg Glu Gly Leu Arg  
260 265 270

Ala Phe Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu Phe Gly  
275 280 285

Leu Leu Glu  
290

<210> 51

<211> 196

<212> PRT

<213> Escherichia coli

<400> 51

Val Ile Ser Tyr Asp Asn Tyr Val Thr Ile Leu Asp Glu Glu Thr Leu  
1 5 10 15

Lys Ala Trp Ile Ala Lys Leu Glu Lys Ala Pro Val Phe Ala Phe Asp  
20 25 30

Thr Glu Thr Asp Ser Leu Asp Asn Ile Ser Ala Asn Leu Val Gly Leu  
35 40 45

Ser Phe Ala Ile Glu Pro Gly Val Ala Ala Tyr Ile Pro Val Ala His  
50 55 60

Asp Tyr Leu Asp Ala Pro Asp Gln Ile Ser Arg Glu Arg Ala Leu Glu  
65 70 75 80

Leu Leu Lys Pro Leu Leu Glu Asp Glu Lys Ala Leu Lys Val Gly Gln  
85 90 95

Asn Leu Lys Tyr Asp Arg Gly Ile Leu Ala Asn Tyr Gly Ile Glu Leu  
100 105 110

Arg Gly Ile Ala Phe Asp Thr Met Leu Glu Ser Tyr Ile Leu Asn Ser  
115 120 125

Val Ala Gly Arg His Asp Met Asp Ser Leu Ala Glu Arg Trp Leu Lys  
130 135 140

His Lys Thr Ile Thr Phe Glu Glu Ile Ala Gly Lys Gly Lys Asn Gln  
145 150 155 160



Leu Thr Phe Asn Gln Ile Ala Leu Glu Glu Ala Gly Arg Tyr Ala Ala  
 165 170 175

Glu Asp Ala Asp Val Thr Leu Gln Leu His Leu Lys Met Trp Pro Asp  
 180 185 190

Leu Gln Lys His  
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<210> 52  
 <211> 686  
 <212> PRT  
 <213> Bacillus circulans

<400> 52

Ala Pro Asp Thr Ser Val Ser Asn Lys Gln Asn Phe Ser Thr Asp Val  
 1 5 10 15

Ile Tyr Gln Ile Phe Thr Asp Arg Phe Ser Asp Gly Asn Pro Ala Asn  
 20 25 30

Asn Pro Thr Gly Ala Ala Phe Asp Gly Thr Cys Thr Asn Leu Arg Leu  
 35 40 45

Tyr Cys Gly Gly Asp Trp Gln Gly Ile Ile Asn Lys Ile Asn Asp Gly  
 50 55 60

Tyr Leu Thr Gly Met Gly Val Thr Ala Ile Trp Ile Ser Gln Pro Val  
 65 70 75 80

Glu Asn Ile Tyr Ser Ile Ile Asn Tyr Ser Gly Val Asn Asn Thr Ala  
 85 90 95

Tyr His Gly Tyr Trp Ala Arg Asp Phe Lys Lys Thr Asn Pro Ala Tyr  
 100 105 110

Gly Thr Ile Ala Asp Phe Gln Asn Leu Ile Ala Ala Ala His Ala Lys  
 115 120 125

Asn Ile Lys Val Ile Ile Asp Phe Ala Pro Asn His Thr Ser Pro Ala  
 130 . 135 140

Ser Ser Asp Gln Pro Ser Phe Ala Glu Asn Gly Arg Leu Tyr Asp Asn  
 145 150 155 160

Gly Thr Leu Leu Gly Gly Tyr Thr Asn Asp Thr Gln Asn Leu Phe His  
 165 170 175

His Asn Gly Gly Thr Asp Phe Ser Thr Thr Glu Asn Gly Ile Tyr Lys  
 180 185 190

Asn Leu Tyr Asp Leu Ala Asp Leu Asn His Asn Asn Ser Thr Val Asp  
 195 200 205

Val Tyr Leu Lys Asp Ala Ile Lys Met Trp Leu Asp Leu Gly Ile Asp  
 210 215 220

Gly Ile Arg Met Asp Ala Val Lys His Met Pro Phe Gly Trp Gln Lys  
 225 230 235 240

Ser Phe Met Ala Ala Val Asn Asn Tyr Lys Pro Val Phe Thr Phe Gly  
 245 250 255

Glu Trp Phe Leu Gly Val Asn Glu Val Ser Pro Glu Asn His Lys Phe  
 260 265 270

Ala Asn Glu Ser Gly Met Ser Leu Leu Asp Phe Arg Phe Ala Gln Lys  
 275 280 285

Val Arg Gln Val Phe Arg Asp Asn Thr Asp Asn Met Tyr Gly Leu Lys  
 290 295 300

Ala Met Leu Glu Gly Ser Ala Ala Asp Tyr Ala Gln Val Asp Asp Gln  
 305 310 315 320

Val Thr Phe Ile Asp Asn His Asp Met Glu Arg Phe His Ala Ser Asn

325

330

335

Ala Asn Arg Arg Lys Leu Glu Gln Ala Leu Ala Phe Thr Leu Thr Ser  
 340 345 350

Arg Gly Val Pro Ala Ile Tyr Tyr Gly Thr Glu Gln Tyr Met Ser Gly  
 355 360 365

Gly Thr Asp Pro Asp Asn Arg Ala Arg Ile Pro Ser Phe Ser Thr Ser  
 370 375 380

Thr Thr Ala Tyr Gln Val Ile Gln Lys Leu Ala Pro Leu Arg Lys Cys  
 385 390 395 400

Asn Pro Ala Ile Ala Tyr Gly Ser Thr Gln Glu Arg Trp Ile Asn Asn  
 405 410 415

Asp Val Leu Ile Tyr Glu Arg Lys Phe Gly Ser Asn Val Ala Val Val  
 420 425 430

Ala Val Asn Arg Asn Leu Asn Ala Pro Ala Ser Ile Ser Gly Leu Val  
 435 440 445

Thr Ser Leu Pro Gln Gly Ser Tyr Asn Asp Val Leu Gly Gly Leu Leu  
 450 455 460

Asn Gly Asn Thr Leu Ser Val Gly Ser Gly Gly Ala Ala Ser Asn Phe  
 465 470 475 480

Thr Leu Ala Ala Gly Gly Thr Ala Val Trp Gln Tyr Thr Ala Ala Thr  
 485 490 495

Ala Thr Pro Thr Ile Gly His Val Gly Pro Met Met Ala Lys Pro Gly  
 500 505 510

Val Thr Ile Thr Ile Asp Gly Arg Gly Phe Gly Ser Ser Lys Gly Thr  
 515 520 525

Val Tyr Phe Gly Thr Thr Ala Val Ser Gly Ala Asp Ile Thr Ser Trp  
 530 535 540

Glu Asp Thr Gln Ile Lys Val Lys Ile Pro Ala Val Ala Gly Gly Asn  
 545 550 555 560

Tyr Asn Ile Lys Val Ala Asn Ala Ala Gly Thr Ala Ser Asn Val Tyr  
 565 570 575

Asp Asn Phe Glu Val Leu Ser Gly Asp Gln Val Ser Val Arg Phe Val  
 580 585 590

Val Asn Asn Ala Thr Thr Ala Leu Gly Gln Asn Val Tyr Leu Thr Gly  
 595 600 605

Ser Val Ser Glu Leu Gly Asn Trp Asp Pro Ala Lys Ala Ile Gly Pro  
 610 615 620

Met Tyr Asn Gln Val Val Tyr Gln Tyr Pro Asn Trp Tyr Tyr Asp Val  
 625 630 635 640

Ser Val Pro Ala Gly Lys Thr Ile Glu Phe Lys Phe Leu Lys Lys Gln  
 645 650 655

Gly Ser Thr Val Thr Trp Glu Gly Gly Ser Asn His Thr Phe Thr Ala  
 660 665 670

Pro Ser Ser Gly Thr Ala Thr Ile Asn Val Asn Trp Gln Pro  
 675 680 685

<210> 53  
 <211> 399  
 <212> PRT  
 <213> Bordetella pertussis

<400> 53

Met Gln Gln Ser His Gln Ala Gly Tyr Ala Asn Ala Ala Asp Arg Glu  
 1 5 10 15

Ser Gly Ile Pro Ala Ala Val Leu Asp Gly Ile Lys Ala Val Ala Lys  
 20 25 30

Glu Lys Asn Ala Thr Leu Met Phe Arg Leu Val Asn Pro His Ser Thr  
 35 40 45

Ser Leu Ile Ala Glu Gly Val Ala Thr Lys Gly Leu Gly Val His Ala  
 50 55 60

Lys Ser Ser Asp Trp Gly Leu Gln Ala Gly Tyr Ile Pro Val Asn Pro  
 65 70 75 80

Asn Leu Ser Lys Leu Phe Gly Arg Ala Pro Glu Val Ile Ala Arg Ala  
 85 90 95

Asp Asn Asp Val Asn Ser Ser Leu Ala His Gly His Thr Ala Val Asp  
 100 105 110

Leu Thr Leu Ser Lys Glu Arg Leu Asp Tyr Leu Arg Gln Ala Gly Leu  
 115 120 125

Val Thr Gly Met Ala Asp Gly Val Val Ala Ser Asn His Ala Gly Tyr  
 130 135 140

Glu Gln Phe Glu Phe Arg Val Lys Glu Thr Ser Asp Gly Arg Tyr Ala  
 145 150 155 160

Val Gln Tyr Arg Arg Lys Gly Gly Asp Asp Phe Glu Ala Val Lys Val  
 165 170 175

Ile Gly Asn Ala Ala Gly Ile Pro Leu Thr Ala Asp Ile Asp Met Phe  
 180 185 190

Ala Ile Met Pro His Leu Ser Asn Phe Arg Asp Ser Ala Arg Ser Ser  
 195 200 205

Val Thr Ser Gly Asp Ser Val Thr Asp Tyr Leu Ala Arg Thr Arg Arg  
 210 215 220

Ala Ala Ser Glu Ala Thr Gly Gly Leu Asp Arg Glu Arg Ile Asp Leu  
 225 230 235 240

Leu Trp Lys Ile Ala Arg Ala Gly Ala Arg Ser Ala Val Gly Thr Glu  
 245 250 255

Ala Arg Arg Gln Phe Arg Tyr Asp Gly Asp Met Asn Ile Gly Val Ile  
 260 265 270

Thr Asp Phe Glu Leu Glu Val Arg Asn Ala Leu Asn Arg Arg Ala His  
 275 280 285

Ala Val Gly Ala Gln Asp Val Val Gln His Gly Thr Glu Gln Asn Asn  
 290 295 300

Pro Phe Pro Glu Ala Asp Glu Lys Ile Phe Val Val Ser Ala Thr Gly  
 305 310 315 320

Glu Ser Gln Met Leu Thr Arg Gly Gln Leu Lys Glu Tyr Ile Gly Gln  
 325 330 335

Gln Arg Gly Glu Gly Tyr Val Phe Tyr Glu Asn Arg Ala Tyr Gly Val  
 340 345 350

Ala Gly Lys Ser Leu Phe Asp Asp Gly Leu Gly Ala Ala Pro Gly Val  
 355 360 365

Pro Ser Gly Arg Ser Lys Phe Ser Pro Asp Val Leu Glu Thr Val Pro  
 370 375 380

Ala Ser Pro Gly Leu Arg Arg Pro Ser Leu Gly Ala Val Glu Arg  
 385 390 395

<210> 54  
 <211> 275  
 <212> PRT  
 <213> Bacillus amyloliquefaciens

<400> 54

Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile Lys Ala Pro Ala Leu  
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 His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp  
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 Ser Gly Ile Asp Ser Ser His Pro Asp Leu Lys Val Ala Gly Gly Ala  
 35 40 45  
 Ser Met Val Pro Ser Glu Thr Asn Pro Phe Gln Asp Asn Asn Ser His  
 50 55 60  
 Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asn Asn Ser Ile Gly  
 65 70 75 80  
 Val Leu Gly Val Ala Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu  
 85 90 95  
 Gly Ala Asp Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu  
 100 105 110  
 Trp Ala Ile Ala Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly  
 115 120 125  
 Pro Ser Gly Ser Ala Ala Leu Lys Ala Ala Val Asp Lys Ala Val Ala  
 130 135 140  
 Ser Gly Val Val Val Val Ala Ala Ala Gly Asn Glu Gly Thr Ser Gly  
 145 150 155 160  
 Ser Ser Ser Thr Val Gly Tyr Pro Gly Lys Tyr Pro Ser Val Ile Ala  
 165 170 175  
 Val Gly Ala Val Asp Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Val  
 180 185 190  
 Gly Pro Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr  
 195 200 205

Leu Pro Gly Asn Lys Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Ser  
 210 215 220

Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn  
 225 230 235 240

Trp Thr Asn Thr Gln Val Arg Ser Ser Leu Glu Asn Thr Thr Thr Lys  
 245 250 255

Leu Gly Asp Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala  
 260 265 270

Ala Ala Gln  
 275

<210> 55  
 <211> 182  
 <212> PRT  
 <213> Bacillus subtilis

<400> 55

Ala Ala Glu His Asn Pro Val Val Met Val His Gly Ile Gly Gly Ala  
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 20 25 30

Ser Arg Asp Lys Leu Tyr Ala Val Asp Phe Trp Asp Lys Thr Gly Thr  
 35 40 45

Asn Tyr Asn Asn Gly Pro Val Leu Ser Arg Phe Val Gln Lys Val Leu  
 50 55 60

Asp Glu Thr Gly Ala Lys Lys Val Asp Ile Val Ala His Ser Met Gly  
 65 70 75 80

Gly Ala Asn Thr Leu Tyr Tyr Ile Lys Asn Leu Asp Gly Gly Asn Lys  
 85 90 95



Val Ala Asn Val Val Thr Leu Gly Gly Ala Asn Arg Leu Thr Thr Gly  
 100 105 110

Lys Ala Leu Pro Gly Thr Asp Pro Asn Gln Lys Ile Leu Tyr Thr Ser  
 115 120 125

Ile Tyr Ser Ser Ala Asp Met Ile Val Met Asn Tyr Leu Ser Arg Leu  
 130 135 140

Asp Gly Ala Arg Asn Val Gln Ile His Gly Val Gly His Ile Gly Leu  
 145 150 155 160

Leu Tyr Ser Ser Gln Val Asn Ser Leu Ile Lys Glu Gly Leu Asn Gly  
 165 170 175

Gly Gly Gln Asn Thr Asn  
 180

<210> 56

<211> 444

<212> DNA

<213> Homo sapiens

<400> 56

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 cagaatccca cagaagcaga gttacaggac atgattaatg aagtagatgc tgatggtaat 180  
 ggcacaattg acttccttga atttctgaca atgatggcaa gaaaaatgaa agacacagac 240  
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 agtgctgcag aacttcgcca tgtgatgaca aaccttggag agaagttaac agatgaagaa 360  
 gttgatgaaa tgatcaggga agcagatatt gatggtgatg gtcaagtaaa ctatgaagag 420  
 tttgtacaaa tgatgacagc aaag 444

<210> 57

<211> 2058

&lt;212&gt; DNA

<213> *Bacillus circulans*

&lt;400&gt; 57

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atcaacgacg gttacctgac cgggatgggc gttaccgcca tctggatctc ccagccggtc      240
gaaaacatct acagcatcat caattattcc ggcgtaaaca acacggccta tcacggctac      300
tgggcccggg acttcaagaa gacgaatccg gcctacggca cgattgcgga cttccagaac      360
ctgatcgccg ccgcgcatgc aaaaaacatc aaagtcatta tcgactttgc cccgaaccat      420
acgtcgcccc cctcgtccga ccagccttcc tttgcggaaa acggccgggt gtacgataac      480
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acggactttt ccacgaccga aaacggcatc tacaaaaacc tgtacgatct cgccgacctg      600
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ggcgtaaata aagtgcgccc ggaaaacccat aagtttgcca acgaatccgg catgagcctg      840
cttgattttc gttttgcccc aaaggtgcgg caggtgttcc gggacaacac cgacaatatg      900
tacggcctga aggcgatgct ggagggctcc gcagccgatt acgcccaggt ggatgaccag      960
gtgacgttca tcgacaacca tgacatggag cgtttccacg caagcaatgc aaaccgcccg      1020
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aaccgggcca tcgcctacgg atcgacgcag gagcgctgga tcaacaacga cgtgctcatt      1260
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ccggcttcca tttcgggact tgtcacttcc ctgccgcaag gcagctacaa cgacgtcctt      1380
ggcggccttc tgaacggcaa cacgttatcg gtaggctccg gcggggccgc ctccaatttc      1440

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 agcgttcggg ccggcaaaac gatcgagttc aagtttttga aaaaacaagg ctccaccgtc 1980  
 acgtgggaag gcggcagcaa ccacaccttc accgcgccgt ccagcggcac cgcgaccatt 2040  
 aacgtgaatt ggcagcca 2058

<210> 58  
 <211> 1197  
 <212> DNA  
 <213> Bordetella pertussis

<400> 58  
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 aacagcagcc tggcgcattg ccataccgcg gtcgacctga cgctgtcgaa agagcggctt 360  
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cgcacgcggc gggccgccag cgaggccacg ggcggcctgg atcgcgaacg catcgacttg 720  
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 aatgcgctga acaggcgggc gcacgcgcgtc ggcgcgcagg acgtgggtcca gcatggcact 900  
 gagcagaaca atcctttccc ggaggcagat gagaagattt tcgtcgtatc ggccaccggt 960  
 gaaagccaga tgctcacgcg cgggcaactg aaggaatata ttggccagca gcgcggcgag 1020  
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<210> 59  
 <211> 825  
 <212> DNA  
 <213> *Bacillus amyloliquefaciens*

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 gatttaaagg tagcaggcgg agccagcatg gttccttctg aaacaaatcc tttccaagac 180  
 aacaactctc acggaactca cgttgccggc acagttgcgg ctcttaataa ctcaatcggg 240  
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 tccggccaat acagctggat cattaacgga atcgagtggg cgatcgcaaa caatatggac 360  
 gttattaaca tgagcctcgg cggaccttct ggttctgctg ctttaaaagc ggcagttgat 420  
 aaagccggtg catccggcgt cgtagtcggt gcggcagccg gtaacgaagg cacttccggc 480  
 agctcaagca cagtgggcta ccctggtaaa tacccttctg tcattgcagt aggcgctggt 540  
 gacagcagca accaaagagc atctttctca agcgtaggac ctgagcttga tgtcatggca 600  
 cctggcggtat ctatccaaag cacgcttcct ggaacaaat acggggcgta caacggtacg 660  
 tcaatggcat ctccgcacgt tgccggagcg gctgctttga ttctttctaa gcacccgaac 720  
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ttctactatg gaaaagggct gatcaacgta caggcggcag ctacag 825

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 <211> 873  
 <212> DNA  
 <213> *Thermus thermophilus*

<400> 60  
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 gtggacttcc gcgcctcgt gggggacccc tccgacaacc tccccggggg caagggcatc 600  
 ggggagaaga ccgccctcaa gctcctcaag gagtggggaa gcctggaaaa cctcctcaag 660  
 aacctggacc gggtaaagcc agaaaacgtc cgggagaaga tcaaggccca cctggaagac 720  
 ctacggctct ccttggagct ctcccggtg cgcaccgacc tccccctgga ggtggacctc 780  
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 ggcagcctcc tccacgagtt cggcctcctg gag 873

<210> 61  
 <211> 588  
 <212> DNA  
 <213> *Escherichia coli*

<400> 61  
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gatcgcggta ttctggcgaa ctacggcatt gaactgcgtg ggattgcgtt tgataccatg 360
ctggagtcct acattctcaa tagcgttgcc gggcgtcacg atatggacag cctcgcggaa 420
cgttggttga agcacaaaac catcactttt gaagagattg ctggtaaagg caaaaatcaa 480
ctgaccttta accagattgc cctcgaagaa gccggacgtt acgccgccga agatgcagat 540
gtcaccttgc agttgcatct gaaaatgtgg ccggatctgc aaaaacac 588

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<210> 62
<211> 1637
<212> DNA
<213> Thermus aquaticus

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<220>
<221> CDS
<222> (1)..(1635)

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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu
20 25 30

ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144
Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu
35 40 45

cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192
Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala
50 55 60

aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240
Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro
65 70 75 80

ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr
85 90 95

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acc	ccc	gag	ggg	gtg	gcc	cgg	cgc	tac	ggc	ggg	gag	tgg	acg	gag	gag	336
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
			100					105					110			
gcg	ggg	gag	cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	384
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
		115					120					125				
ggg	agg	ctt	gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	432
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
	130					135					140					
gag	agg	ccc	ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	480
Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	
145					150					155					160	
cgc	ctg	gac	gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	528
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
			165						170					175		
gag	atc	gcc	cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	576
Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	
		180						185					190			
ttc	aac	ctc	aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	624
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	
	195						200					205				
cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	
	210					215					220					
acc	agc	gcc	gcc	gtc	ctg	gag	gcc	ctc	cgc	gag	gcc	cac	ccc	atc	gtg	720
Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	
225					230					235					240	
ggg	aag	atc	ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac	768
Gly	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	
			245					250						255		
att	gac	ccc	ttg	ccg	gac	ctc	atc	cac	ccc	agg	acg	ggc	cgc	ctc	cac	816
Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	
		260					265					270				
acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc	864
Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	
		275					280					285				
gat	ccc	aac	ctc	cag	aac	atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg	912
Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	

290	295	300	
atc cgc cgg gcc ttc Ile Arg Arg Ala Phe 305	atc gcc gag gag ggg Ile Ala Glu Glu Gly 310	tgg cta ttg gtg gcc ctg Trp Leu Leu Val Ala Leu 315 320	960
gat tat agc cag ata Asp Tyr Ser Gln Ile 325	gag ctc agg gtg ctg Glu Leu Arg Val Leu 330	gcc cac ctc tcc ggc gac Ala His Leu Ser Gly Asp 335	1008
gag aac ctg ata cgg Glu Asn Leu Ile Arg 340	gtc ttc cag gag ggg Val Phe Gln Glu Gly 345	cgg gac atc cac acg gag Arg Asp Ile His Thr Glu 350	1056
acc gcc agc tgg atg ttc Thr Ala Ser Trp Met Phe 355	ggc gtc ccc cgg gag Gly Val Pro Arg Glu 360	gcc gtg gac ccc ctg Ala Val Asp Pro Leu 365	1104
atg cgc cgg gcg gcc aag Met Arg Arg Ala Ala Lys 370	acc atc aac ttc ggg Thr Ile Asn Phe Gly 375 380	gtc ctc tac ggc atg Val Leu Tyr Gly Met 380	1152
tcg gcc cac cgc ctc tcc Ser Ala His Arg Leu Ser 385 390	cag gag cta gcc atc Gln Glu Leu Ala Ile 395	cct tac gag gag gcc Pro Tyr Glu Glu Ala 400	1200
cag gcc ttc ata gag cgc Gln Ala Phe Ile Glu Arg 405	tgc ttt cag agc ttc Cys Phe Gln Ser Phe 410	ccc aag gtg cgg gcc Pro Lys Val Arg Ala 415	1248
tgg att gag aag acc ctg Trp Ile Glu Lys Thr Leu 420	gag gag ggc agg agg Glu Glu Gly Arg Arg 425	cgg ggg tac gtg gag Arg Gly Tyr Val Glu 430	1296
acc ctc ttc ggc cgc cgc Thr Leu Phe Gly Arg Arg 435	cgc tac gtg cca gac Arg Tyr Val Pro Asp 440	cta gag gcc cgg gtg Leu Glu Ala Arg Val 445	1344
aag agc gtg cgg gag gcg Lys Ser Val Arg Glu Ala 450	gca gag cgc atg gcc Ala Glu Arg Met Ala 455 460	ttc aac atg ccc gtc Phe Asn Met Pro Val 460	1392
cag ggc acc gcc gcc gac Gln Gly Thr Ala Ala Asp 465 470	ctc atg aag ctg gct Leu Met Lys Leu Ala 475	atg gtg aag ctc ttc Met Val Lys Leu Phe 480	1440
ccc agg ctg gag gaa atg Pro Arg Leu Glu Glu Met 485	ggg gcc agg atg ctc Gly Ala Arg Met Leu 490	ctt cag gtc cac gac Leu Leu Gln Val His Asp 495	1488
gag ctg gtc ctc gag gcc gag gcc cca aaa gag gag ggg gcg gag gcc gtg gcc cgg			1536



Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

ctg gtc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Val Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

gcc gc 1637  
 Ala  
 545

<210> 63  
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 <212> PRT  
 <213> Thermus aquaticus

<400> 63

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Gly Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Cys Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Val Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

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 <212> DNA  
 <213> Thermus aquaticus

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 <222> (1)..(1635)

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 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80  
 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95  
 acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag 336  
 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110  
 gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg 384  
 Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp

115	120	125	
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val 130 135 140			432
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val 145 150 155 160			480
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu 165 170 175			528
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cgc ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly Arg Pro 180 185 190			576
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205			624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220			672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240			720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255			768
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270			816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285			864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300			912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320			960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac			1008

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp	
325 330 335	
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag	1056
Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu	
340 345 350	
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg	1104
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
355 360 365	
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg	1152
Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
385 390 395 400	
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	
450 455 460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc	1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe	
465 470 475 480	
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac	1488
Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp	
485 490 495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg	1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	
515 520 525	

gag gtg gag gtg ggg ata ggg gag gac cgg ctc tcc gcc aag gag gcg 1632  
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gcc gc 1637  
 Ala  
 545

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 <213> *Thermus aquaticus*

<400> 65

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly Arg Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350



Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Arg Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala

545

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 <212> DNA  
 <213> *Thermus aquaticus*

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 <222> (1)..(1635)

<400> 66  
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 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80  
 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95  
 acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag 336  
 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110  
 gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg 384  
 Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125  
 ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg 432  
 Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140  
 gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg 480

Glu 145	Arg	Pro	Leu	Ser	Ala 150	Val	Leu	Ala	His	Met 155	Glu	Ala	Thr	Gly	Val 160	
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Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
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gag	atc	gcc	cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	576
Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	
			180					185					190			
ttc	aac	ctc	aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	624
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	
		195					200					205				
cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	
	210					215					220					
acc	agc	gcc	gcc	gtc	ctg	gag	gcc	ctc	cgc	gag	gcc	cac	ccc	atc	gtg	720
Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	
225					230					235					240	
gag	aag	atc	ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac	768
Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	
			245					250						255		
att	gac	ccc	ttg	ccg	gac	ctc	atc	cac	ccc	agg	acg	ggc	cgc	ctc	cac	816
Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	
		260						265					270			
acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc	864
Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	
		275					280					285				
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Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Ile	Arg	Thr	Pro	Leu	Gly	Gln	Arg	
	290					295					300					
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Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu	
305					310				315						320	
gac	tat	agc	cag	ata	gag	ctc	agg	gtg	ctg	gcc	cac	ctc	tcc	ggc	gac	1008
Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	
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gag	aac	ctg	atc	cgg	gtc	ttc	cag	gag	ggg	cgg	gac	ttc	cac	acg	gag	1056
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Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
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atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg	1152
Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
385 390 395 400	
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc aag gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val	
450 455 460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc	1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe	
465 470 475 480	
ccc agg ctg gag gaa atg gag gcc agg atg ctc ctt cag gtc cac gac	1488
Pro Arg Leu Glu Glu Met Glu Ala Arg Met Leu Leu Gln Val His Asp	
485 490 495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gca gtg gcc cgg	1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	
515 520 525	
gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg	1632
Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala	
530 535 540	
gcc gc	1637
Ala	
545	

<210> 67  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

<400> 67

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Ile Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Phe His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met

370

375

380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Glu Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 68  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(1635)

&lt;400&gt; 68

agc	ccc	aag	gcc	ctg	gag	gag	gcc	ccc	tgg	ccc	ccg	ccg	gaa	ggg	gcc	48
Ser	Pro	Lys	Ala	Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala	
1				5					10					15		

ttc	gtg	ggc	ttt	gtg	ctt	tcc	cgc	aag	gag	ccc	atg	tgg	gcc	gat	ctt	96
Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	
			20					25					30			

ctg	gcc	ctg	gcc	gcc	gcc	agg	ggg	ggc	cgg	gtc	cac	cgg	gcc	ccc	gag	144
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	
			35				40					45				

cct	tat	aaa	gcc	ctc	agg	gac	ctg	aag	gag	gcg	cgg	ggg	ctt	ctc	gcc	192
Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	
	50					55					60					

aaa	gac	ctg	agc	gtt	ctg	gcc	ctg	agg	gaa	ggc	ctt	ggc	ctc	ccg	ccc	240
Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	
65					70					75					80	

ggc	gac	gac	ccc	atg	ctc	ctc	gcc	tac	ctc	ctg	gac	cct	tcc	aac	acc	288
Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	
			85						90					95		

acc	ccc	gag	ggg	gtg	gcc	cgg	cgc	tac	ggc	ggg	gag	tgg	acg	gag	gag	336
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
			100					105					110			

gcg	ggg	gag	cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	384
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
			115				120					125				

ggg	agg	ctt	gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	432
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
	130					135				140						

gag	agg	ccc	ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	480
Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	
145					150					155					160	

cgc	ctg	gac	gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	528
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
				165					170					175		



gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190	576
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205	624
cta ggg ctt ccc gcc atc ggc aag acg gag aag tcc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Ser Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768
att gac ccc ttg ccg gac cac atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp His Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335	1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152

tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
385 390 395 400	
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tat gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	
450 455 460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc	1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe	
465 470 475 480	
ccc agg ctg gag gaa atg ggg gcc agg aag ctc ctt cag gtc cac gac	1488
Pro Arg Leu Glu Glu Met Gly Ala Arg Lys Leu Leu Gln Val His Asp	
485 490 495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg	1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	
515 520 525	
gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg	1632
Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala	
530 535 540	
gcc gc	1637
Ala	
545	

<210> 69  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

&lt;400&gt; 69

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu

195

200

205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Ser Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp His Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Lys Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 70  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 70

agc Ser 1	ccc Pro	aag Lys	gcc Ala	ctg Leu	gag Glu	gag Glu	gcc Ala	ccc Pro	tgg Trp	ccc Pro	ccg Pro	ccg Pro	gaa Glu	ggg Gly	gcc Ala	48
ttc Phe	gtg Val	ggc Gly	ttt Phe	gtg Val	ctt Leu	tcc Ser	cgc Arg	aag Lys	gag Glu	ccc Pro	atg Met	tgg Trp	gcc Ala	gat Asp	ctt Leu	96
ctg Leu	gcc Ala	ctg Leu	gcc Ala	gcc Ala	gcc Ala	agg Arg	ggg Gly	ggc Gly	cgg Arg	gtc Val	cac His	cgg Arg	gcc Ala	ccc Pro	gag Glu	144
cct Pro	tat Tyr	aaa Lys	gcc Ala	ctc Leu	agg Arg	gac Asp	ctg Leu	aag Lys	gag Glu	gcg Ala	cgg Arg	ggg Gly	ctt Leu	ctc Leu	gcc Ala	192
aaa Lys	gac Asp	ctg Leu	agc Ser	gtt Val	ctg Leu	gcc Ala	ctg Leu	agg Arg	gaa Glu	ggc Gly	ctt Leu	ggc Gly	ctc Leu	ccg Pro	ccc Pro	240
ggc Gly	gac Asp	gac Asp	ccc Pro	atg Met	ctc Leu	ctc Leu	gcc Ala	tac Tyr	ctc Leu	ctg Leu	gac Asp	cct Pro	tcc Ser	aac Asn	acc Thr	288
acc Thr	ccc Pro	gag Glu	ggg Gly	gtg Val	gcc Ala	cgg Arg	cgc Arg	tac Tyr	ggc Gly	ggg Gly	gag Glu	tgg Trp	acg Thr	gag Glu	gag Glu	336
gcg Ala	ggg Gly	gag Glu	cgg Arg	gcc Ala	gcc Ala	ctt Leu	tcc Ser	gag Glu	agg Arg	ctc Leu	ttc Phe	gcc Ala	aac Asn	ctg Leu	tgg Trp	384
ggg Gly	agg Arg	ctt Leu	gag Glu	ggg Gly	gag Glu	gag Glu	agg Arg	ctc Leu	ctt Leu	tgg Trp	ctt Leu	tac Tyr	cgg Arg	gag Glu	gtg Val	432
gag Glu	agg Arg	ccc Pro	ctt Leu	tcc Ser	gct Ala	gtc Val	ctg Leu	gcc Ala	cac His	atg Met	gag Glu	gcc Ala	acg Thr	ggg Gly	gtg Val	480
cgc Arg	ctg Leu	gac Asp	gtg Val	gcc Ala	tat Tyr	ctc Leu	agg Arg	gcc Ala	ttg Leu	tcc Ser	ctg Leu	gag Glu	gtg Val	gcc Ala	gag Glu	528
gag Glu	atc Ile	gcc Ala	cgc Arg	ctc Leu	gag Glu	gcc Ala	gag Glu	gtc Val	ttc Phe	cgc Arg	ctg Leu	gcc Ala	ggc Gly	cac His	ccc Pro	576
ttc Phe	aac Asn	ctc Leu	aac Asn	tcc Ser	cgg Arg	gac Asp	cag Gln	ctg Leu	gaa Glu	agg Arg	gtc Val	ctc Leu	ttt Phe	gac Asp	gag Glu	624

cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cgc ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cgg tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Arg Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335	1008
gag aac ctg atc cgg gtc ttc cag gag ggg ccg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc ccg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala 385 390 395 400	1200
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg ccg gcc Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala 405 410 415 420	1248

405

410

415

tgg	att	gag	aag	acc	ctg	gag	gag	ggc	agg	agg	cgg	ggg	tac	gtg	gag	1296
Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	
			420					425					430			

acc	ctc	ttc	ggc	cgc	cgc	cgc	tac	gtg	cca	gac	cta	gag	gcc	cgg	gtg	1344
Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	
		435					440					445				

aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	ttc	aac	atg	ccc	gtc	1392
Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	
	450					455					460					

cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	act	atg	gtg	aag	ctc	ttc	1440
Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Thr	Met	Val	Lys	Leu	Phe	
465					470					475					480	

ccc	agg	ctg	gag	gaa	atg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac	1488
Pro	Arg	Leu	Glu	Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	
				485					490					495		

gag	ctg	gtc	ctc	gag	gcc	cca	aaa	gag	ggg	gcg	gag	gcc	gtg	gcc	cgg	1536
Glu	Leu	Val	Leu	Glu	Ala	Pro	Lys	Glu	Gly	Ala	Glu	Ala	Val	Ala	Arg	
			500					505					510			

ctg	gcc	aag	gag	gtc	atg	gag	ggg	gtg	tat	ccc	ctg	gcc	gtg	ccc	ctg	1584
Leu	Ala	Lys	Glu	Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	
		515					520					525				

gag	gtg	gag	gtg	ggg	ata	ggg	gag	gac	tgg	ctc	tcc	gcc	aag	gag	gcg	1632
Glu	Val	Glu	Val	Gly	Ile	Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Ala	
	530					535					540					

gcc	gc															1637
Ala																
545																

<210> 71  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

<400> 71

Ser	Pro	Lys	Ala	Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala
1				5					10					15	

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu



20

25

30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Arg Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Thr Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 72  
 <211> 1637  
 <212> DNA  
 <213> *Thermus aquaticus*

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 72  
 agc ccc aag gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc 48  
 Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15  
 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu 35 40 45	144
cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala 50 55 60	192
aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro 65 70 75 80	240
ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr 85 90 95	288
acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu 100 105 110	336
gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp 115 120 125	384
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val 130 135 140	432
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val 145 150 155 160	480
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu 165 170 175	528
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190	576
ctc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Leu Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205	624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val	720

225						230						235						240	
gag aag atc ctg	cag tac cgg	gag ctc acc	aag ctg aag	agc acc tac															768
Glu Lys Ile Leu	Gln Tyr Arg	Glu Leu Thr	Lys Leu Lys	Ser Thr Tyr	245														
att gac ccc ttg	cca gac ctc	atc cac ccc	agg acg ggc	cgc ctc cac															816
Ile Asp Pro Leu	Pro Asp Leu	Ile His Pro	Arg Thr Gly	Arg Leu His	260														
acc cgc ttc aac	cag acg gcc	acg gcc acg	ggc agg cta	agt agc tcc															864
Thr Arg Phe Asn	Gln Thr Ala	Thr Ala Thr	Gly Arg Leu	Ser Ser Ser	275														
gat ccc aac ctc	cag aac atc	ccc gtc cgc	acc ccg ctt	ggg cag agg															912
Asp Pro Asn Leu	Gln Asn Ile	Pro Val Arg	Thr Pro Leu	Gly Gln Arg	290														
atc cgc cgg gcc	ttc atc gcc	gag gag ggg	tgg cta ttg	gtg gcc ctg															960
Ile Arg Arg Ala	Phe Ile Ala	Glu Glu Gly	Trp Leu Leu	Val Ala Leu	305														
gac tat agc cag	ata gag ctc	agg gtg ctg	gcc cac ctc	tcc ggc gac															1008
Asp Tyr Ser Gln	Ile Glu Leu	Arg Val Leu	Ala His Leu	Ser Gly Asp	325														
gag aac ctg atc	cgg gtc ttc	cag gag ggg	cgg gac atc	cac acg gag															1056
Glu Asn Leu Ile	Arg Val Phe	Gln Glu Gly	Arg Asp Ile	His Thr Glu	340														
acc gcc agc tgg	atg ttc ggc	gtc ccc cgg	gag gcc gtg	gac ccc ctg															1104
Thr Ala Ser Trp	Met Phe Gly	Val Pro Arg	Glu Ala Val	Asp Pro Leu	355														
atg cgc cgg gcg	gcc aag gcc	atc aac ttc	ggg gtc ctc	tac ggc atg															1152
Met Arg Arg Ala	Ala Lys Ala	Ile Asn Phe	Gly Val Leu	Tyr Gly Met	370														
tca gcc cac cgc	ctc tcc cag	gag cta gcc	atc cct tac	gag gag gcc															1200
Ser Ala His Arg	Leu Ser Gln	Glu Leu Ala	Ile Pro Tyr	Glu Glu Ala	385														
cag gcc ttc att	gag cgc tac	ttt cag agc	ttc ccc aag	gtg cgg gcc															1248
Gln Ala Phe Ile	Glu Arg Tyr	Phe Gln Ser	Phe Pro Lys	Val Arg Ala	405														
tgg att gag aag	acc ctg gag	gag gag ggc	agg aga cgg	ggg tac gtg															1296
Trp Ile Glu Lys	Thr Leu Glu	Glu Glu Gly	Arg Arg Arg	Gly Tyr Val	420														
acc ctc ttc ggc	cgc cgc cgc	tat gtg cct	gac cta gag	gcc cgg gtg															1344

Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val		
		435					440					445					
aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	tac	aac	atg	ccc	gtc		1392
Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Tyr	Asn	Met	Pro	Val		
	450					455					460						
cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	gct	atg	gtg	aag	ctc	ttc		1440
Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe		
465					470					475					480		
acc	agg	ctg	gag	gaa	acg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac		1488
Thr	Arg	Leu	Glu	Glu	Thr	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp		
				485				490						495			
gag	ctg	gtc	ctc	gag	gcc	cct	aaa	gag	ggg	gcg	gag	gcc	gtg	gcc	cgg		1536
Glu	Leu	Val	Leu	Glu	Ala	Pro	Lys	Glu	Gly	Ala	Glu	Ala	Val	Ala	Arg		
			500					505					510				
ctg	gcc	aag	gag	gtc	atg	gag	ggg	gtg	tat	ccc	ctg	gcc	gtg	ccc	ctg		1584
Leu	Ala	Lys	Glu	Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu		
		515					520					525					
gag	gtg	gag	gtg	ggg	ata	ggg	gag	gac	tgg	ctc	tcc	gcc	aag	gag	gcg		1632
Glu	Val	Glu	Val	Gly	Ile	Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Ala		
	530					535					540						
gcc	gc																1637
Ala																	
545																	

<210> 73  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

<400> 73

Ser	Pro	Lys	Ala	Leu	Glu	Glu	Ala	Pro	Trp	Pro	Pro	Pro	Glu	Gly	Ala		
1				5					10					15			
Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu		
			20					25					30				
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu		
		35					40					45					

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Leu Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Ala Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Tyr Asn Met Pro Val  
 450 455 460



Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Thr Arg Leu Glu Glu Thr Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 74  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 74  
 agc ccc aag gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc 48  
 Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15  
 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala

50	55	60	
aaa gac ctg agc gtt Lys Asp Leu Ser Val 65	ctg gcc ctg agg gaa ggc Leu Ala Leu Arg Glu Gly 70	ctt ggc ctc ccg ccc Leu Gly Leu Pro Pro 75	240
ggc gac gac ccc atg Gly Asp Asp Pro Met 85	ctc ctc gcc tac ctc Leu Leu Ala Tyr Leu 90	ctg gac cct tcc aac acc Leu Asp Pro Ser Asn Thr 95	288
acc ccc gag ggg gtg Thr Pro Glu Gly Val 100	gcc cgg cgc tac ggc Ala Arg Arg Tyr Gly 105	ggg gag tgg acg gag Gly Glu Trp Thr Glu 110	336
gcg ggg gag cgg gcc Ala Gly Glu Arg Ala 115	gcc ctt tcc gag agg Ala Leu Ser Glu Arg 120	ctc ttc gcc aac ctg Leu Phe Ala Asn Leu 125	384
ggg agg ctt gag ggg Gly Arg Leu Glu Gly 130	gag gag agg ctc ctt Glu Glu Arg Leu Leu 135	tgg ctt tac cgg gag Trp Leu Tyr Arg Glu 140	432
gag agg ccc ctt tcc Glu Arg Pro Leu Ser 145	gct gtc ctg gcc cac Ala Val Leu Ala His 150	atg gag gcc acg ggg Met Glu Ala Thr Gly 155	480
cgc ctg gac gtg gcc Arg Leu Asp Val Ala 165	tat ctc agg gcc ttg Tyr Leu Arg Ala Leu 170	tcc ctg gag gtg gcc Ser Leu Glu Val Ala 175	528
gag atc gcc cgc ctc Glu Ile Ala Arg Leu 180	gag gcc gag gtc ttc Ala Glu Val Phe Arg 185	cgc ctg gcc ggc cac Arg Leu Ala Gly His 190	576
ttc aac ctc aac tcc Phe Asn Leu Asn Ser 195	cgg gag cag ctg gaa Arg Asp Gln Leu Glu 200	agg gtc ctc ttt gag Arg Val Leu Phe Asp 205	624
cta ggg ctt ccc gcc Leu Gly Leu Pro Ala 210	atc ggc aag acg gag Ile Gly Lys Thr Glu 215	aag acc ggc aag cgc Lys Thr Gly Lys Arg 220	672
acc agc gcc gcc gtc Thr Ser Ala Ala Val 225	ctg gag gcc ctc cgc Leu Glu Ala Leu Arg 230	gag gcc cac ccc atc Glu Ala His Pro Ile 235	720
gag aag atc ctg cag Glu Lys Ile Leu Gln 245	tac cgg gag ctc acc Tyr Arg Glu Leu Thr 250	aag ctg aag agc acc Lys Leu Lys Ser Thr 255	768
att gac ccc ttg ccg gac ccc atc cac ccc gac ccc atc cac ccc	agg acg ggc cgc ctc agg acg ggc cgc ctc agg acg ggc cgc ctc	cac	816

Ile Asp Pro Leu Pro Asp Pro Ile His Pro Arg Thr Gly Arg Leu His	
260 265 270	
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc	864
Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser	
275 280 285	
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg	912
Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg	
290 295 300	
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg	960
Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu	
305 310 315 320	
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac	1008
Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp	
325 330 335	
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag	1056
Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu	
340 345 350	
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg	1104
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
355 360 365	
atg cgc cgg acg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg	1152
Met Arg Arg Thr Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
385 390 395 400	
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	
450 455 460	

cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc 1440  
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac 1488  
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gtc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Val Arg  
 500 505 510

ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg aag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Lys Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

gcc gc 1637  
 Ala  
 545

<210> 75  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

<400> 75

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
                   85                                  90                                  95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
                   100                                  105                                  110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
                   115                                  120                                  125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
                   130                                  135                                  140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
                   145                                  150                                  155                                  160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
                   165                                  170                                  175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
                   180                                  185                                  190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
                   195                                  200                                  205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
                   210                                  215                                  220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
                   225                                  230                                  235                                  240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
                   245                                  250                                  255

Ile Asp Pro Leu Pro Asp Pro Ile His Pro Arg Thr Gly Arg Leu His  
                   260                                  265                                  270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
                   275                                  280                                  285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Thr Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp

485

490

495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Val Arg  
                   500                                  505                                  510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
           515                                  520                                  525

Glu Val Lys Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
       530                                  535                                  540

Ala  
 545

<210> 76  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 76  
 agc ccc aag gcc ctg gag gag gcc ccc tgg ccc ccg ccg gaa ggg gcc 48  
 Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1                  5                                  10                                  15  
 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
                   20                                  25                                  30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
                   35                                  40                                  45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
           50                                  55                                  60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65                                  70                                  75                                  80  
 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288

Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	
				85					90					95		
acc	ccc	gag	ggg	gtg	gcc	cgg	cgc	tac	ggc	ggg	gag	tgg	acg	gag	gag	336
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
			100					105					110			
gcg	ggg	gag	cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	384
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
		115					120					125				
ggg	agg	ctt	gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	432
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
	130					135					140					
gag	agg	ccc	ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	480
Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	
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cgc	ctg	gac	gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	528
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
			165						170					175		
gag	atc	gcc	cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	576
Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	
			180					185					190			
ttc	aac	ctc	aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	624
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	
		195					200					205				
cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	
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Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	
225					230					235					240	
gag	aag	atc	ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac	768
Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	
			245					250						255		
att	gac	ccc	ttg	ccg	gac	ctc	ttc	cac	ccc	agg	acg	ggc	cgc	ctc	cac	816
Ile	Asp	Pro	Leu	Pro	Asp	Leu	Phe	His	Pro	Arg	Thr	Gly	Arg	Leu	His	
			260					265					270			
acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc	864
Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	
		275					280					285				



gat	ccc	aac	ctc	cag	aac	atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg	912
Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	
	290					295					300					
atc	cgc	cgg	gcc	ttc	atc	gcc	gag	gag	ggg	tgg	cta	ttg	gtg	gtc	ctg	960
Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Val	Leu	
305					310				315						320	
gac	tat	agt	cag	ata	gag	ctc	agg	gtg	ctg	gcc	cac	ctc	tcc	ggc	gac	1008
Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	
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gag	aac	ctg	atc	cgg	gtc	ttc	cag	gag	ggg	cgg	gac	atc	cac	acg	gag	1056
Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu	
		340						345					350			
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Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Arg	Glu	Ala	Val	Asp	Pro	Leu	
		355					360					365				
atg	cgc	cgg	gcg	gcc	aag	acc	atc	aac	ttc	ggg	gtc	ctc	tac	ggc	atg	1152
Met	Arg	Arg	Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	
	370					375					380					
tcg	gcc	cac	cgc	ctc	tcc	cag	gag	cta	gcc	atc	cct	tac	gag	gag	gcc	1200
Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	
385					390					395					400	
cag	gcc	ttc	att	gag	cgc	tac	ttt	cag	agc	ttc	ccc	aag	gtg	cgg	gcc	1248
Gln	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	
			405					410						415		
tgg	att	gag	aag	acc	ctg	gag	gag	ggc	agg	agg	cgg	ggg	tac	gtg	gag	1296
Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	
			420					425					430			
acc	ctc	ttc	ggc	cgc	cgc	cgc	tac	gtg	cca	gac	cta	gag	gcc	cgg	gtg	1344
Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	
		435					440					445				
aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	tcc	aac	atg	ccc	gtc	1392
Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Ser	Asn	Met	Pro	Val	
	450					455					460					
cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	gct	atg	gtg	aag	ctc	ttc	1440
Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	
465					470					475					480	
ccc	agg	ctg	gag	gaa	atg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac	1488
Pro	Arg	Leu	Glu	Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	
			485					490						495		

gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
                   500                                  505                                  510

ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
                   515                                  520                                  525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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gcc gc 1637  
 Ala  
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                   20                                  25                                  30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
           35                                  40                                  45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
           50                                  55                                  60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65                                  70                                  75                                  80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
                   85                                  90                                  95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
                   100                                  105                                  110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
245 250 255

Ile Asp Pro Leu Pro Asp Leu Phe His Pro Arg Thr Gly Arg Leu His  
260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Val Leu

305		310		315		320
Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp						
		325		330		335
Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu						
		340		345		350
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu						
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Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met						
		370		375		380
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala						
		385		390		395
						400
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala						
		405		410		415
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu						
		420		425		430
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val						
		435		440		445
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Ser Asn Met Pro Val						
		450		455		460
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe						
		465		470		475
						480
Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp						
		485		490		495
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg						
		500		505		510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
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Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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Ala  
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 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
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 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95  
 acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag 336  
 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
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gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp 115 120 125	384
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val 130 135 140	432
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val 145 150 155 160	480
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu 165 170 175	528
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190	576
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cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960

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Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp	
325 330 335	
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag	1056
Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu	
340 345 350	
acc gcc agc tgg atg ttc ggc gtc ccc cga gag gcc gtg gac ccc ctg	1104
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
355 360 365	
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg	1152
Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
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cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
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Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
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Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
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Lys Ser Val Arg Lys Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val	
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Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe	
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Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp	
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Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	

144



130

135

140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
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Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
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 355 360 365  
 Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
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 Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400  
 Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
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 420 425 430  
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 435 440 445  
 Lys Ser Val Arg Lys Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val  
 450 455 460  
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 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
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<222> (1)..(1635)

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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu
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ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag      144
Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu
          35          40          45

cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc      192
Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala
          50          55          60

aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc      240
Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro
65          70          75          80

ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc      288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr
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acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag      336
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu
          100          105          110

gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg      384
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp
          115          120          125

ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg      432
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val
          130          135          140

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cta Leu 210	ggg Gly	ctt Leu	ccc Pro	gcc Ala	atc Ile	ggc Gly 215	aag Lys	acg Thr	gag Glu	aag Lys	acc Thr 220	ggc Gly	aag Lys	cgc Arg	tcc Ser	672
acc Thr 225	agc Ser	gcc Ala	gcc Ala	gtc Val	ctg Leu 230	gag Glu	gcc Ala	ctc Leu	cgc Arg	gag Glu 235	gcc Ala	cac His	ccc Pro	atc Ile	gtg Val 240	720
gag Glu	aag Lys	atc Ile	ctg Leu	cag Gln 245	tac Tyr	cgg Arg	gag Glu	ctc Leu	acc Thr 250	aag Lys	ctg Leu	aag Lys	agc Ser	acc Thr 255	tac Tyr	768
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acc Thr	cgc Arg	ttc Phe 275	aac Asn	cag Gln	acg Thr	gcc Ala	acg Thr	gcc Ala	acg Thr	ggc Gly	agg Arg	cta Leu 285	agt Ser	agc Ser	tcc Ser	864
gat Asp 290	ccc Pro	aac Asn	ctc Leu	cag Gln	aac Asn	atc Ile 295	ccc Pro	gtc Val	cgc Arg	acc Thr 300	ccg Pro	ctt Leu	ggg Gly	cag Gln	agg Arg	912
atc Ile 305	cgc Arg	cgg Arg	gcc Ala	ttc Phe 310	atc Ile	gcc Ala	gag Glu	gag Glu	ggg Gly 315	tgg Trp	cta Leu	ttg Leu	gtg Val	gcc Ala	ctg Leu 320	960
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340

345

350

acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg 1104  
 Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
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atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg 1152  
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 370 375 380

tgc gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc 1200  
 Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
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cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc 1248  
 Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

tgg att gag aag acc ctg gag gag gcc agg agg cgg ggg tac gtg gag 1296  
 Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg 1344  
 Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

aag agc gtg cgg gag gcg gcc gag cgc agg gcc ttc aac atg ccc gtc 1392  
 Lys Ser Val Arg Glu Ala Ala Glu Arg Arg Ala Phe Asn Met Pro Val  
 450 455 460

cag gcc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc 1440  
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac 1488  
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

gcc gc 1637

Ala  
545

<210> 81  
<211> 545  
<212> PRT  
<213> *Thermus aquaticus*  
  
<400> 81

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
1 5 10 15

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Arg Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 82  
 <211> 1637



<212> DNA  
 <213> *Thermus aquaticus*

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 82

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ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt	96
Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu	
20 25 30	

ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag	144
Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu	
35 40 45	

cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc	192
Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala	
50 55 60	

aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc	240
Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro	
65 70 75 80	

ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc	288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr	
85 90 95	

acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag	336
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu	
100 105 110	

gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg	384
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp	
115 120 125	

ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg	432
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val	
130 135 140	

gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg	480
Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val	
145 150 155 160	

cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag	528
Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu	

165	170	175	
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190			576
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205			624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220			672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240			720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255			768
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270			816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285			864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300			912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gtc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Val Leu 305 310 315 320			960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335			1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350			1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365			1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg			1152

Met	Arg	Arg	Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met	
370						375					380					
tcg	gcc	cac	cgc	ctc	tcc	cag	gag	cta	gcc	atc	cct	tac	gag	gag	gcc	1200
Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala	
385					390					395					400	
cag	gcc	ttc	att	gag	cgc	tac	ttt	cag	agc	ttc	ccc	aag	gtg	cgg	gcc	1248
Gln	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	Pro	Lys	Val	Arg	Ala	
				405					410					415		
tgg	att	gag	aag	acc	ctg	gag	gag	ggc	agg	agg	cgg	ggg	tac	gtg	gag	1296
Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Arg	Arg	Gly	Tyr	Val	Glu	
			420					425					430			
acc	ctc	ttc	ggc	cgc	cgc	cgc	tac	gtg	cca	gac	cta	gag	gcc	cgg	gtg	1344
Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	Leu	Glu	Ala	Arg	Val	
			435				440					445				
aag	agc	gtg	cgg	gag	gcg	gcc	gag	cgc	atg	gcc	ttc	aac	atg	ccc	gtc	1392
Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	Phe	Asn	Met	Pro	Val	
	450					455					460					
cag	ggc	acc	gcc	gcc	gac	ctc	atg	aag	ctg	gct	atg	gtg	aag	ctc	ttc	1440
Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	Met	Val	Lys	Leu	Phe	
465					470					475					480	
ccc	agg	ctg	gag	gaa	atg	ggg	gcc	agg	atg	ctc	ctt	cag	gtc	cac	gac	1488
Pro	Arg	Leu	Glu	Glu	Met	Gly	Ala	Arg	Met	Leu	Leu	Gln	Val	His	Asp	
				485					490					495		
gag	ctg	gtc	ctc	gag	gcc	cca	aaa	gag	ggg	gcg	gag	gcc	gtg	gcc	cgg	1536
Glu	Leu	Val	Leu	Glu	Ala	Pro	Lys	Glu	Gly	Ala	Glu	Ala	Val	Ala	Arg	
			500					505					510			
ctg	gcc	aag	gag	gtc	atg	gag	ggg	gtg	tat	ccc	ctg	gcc	gtg	ccc	ctg	1584
Leu	Ala	Lys	Glu	Val	Met	Glu	Gly	Val	Tyr	Pro	Leu	Ala	Val	Pro	Leu	
		515					520					525				
gag	gtg	gag	gtg	ggg	ata	ggg	gag	gac	tgg	ctc	tcc	gcc	aag	gag	gcg	1632
Glu	Val	Glu	Val	Gly	Ile	Gly	Glu	Asp	Trp	Leu	Ser	Ala	Lys	Glu	Ala	
	530					535					540					
gcc	gc															1637
Ala																
545																
<210>	83															
<211>	545															
<212>	PRT															

&lt;213&gt; Thermus aquaticus

&lt;400&gt; 83

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
 1 5 10 15

Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Val Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
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Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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Ala  
 545

<210> 84  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

&lt;400&gt; 84

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Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala	
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ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt	96
Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu	
20 25 30	
ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag	144
Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu	
35 40 45	
cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc	192
Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala	
50 55 60	
aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc	240
Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro	
65 70 75 80	
ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc	288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr	
85 90 95	
acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag	336
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu	
100 105 110	
gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg	384
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp	
115 120 125	
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg	432
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val	
130 135 140	
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg	480
Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val	
145 150 155 160	
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag	528
Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu	
165 170 175	
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc	576
Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro	
180 185 190	
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag	624

Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu		
	195						200					205					
cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc		672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser		
	210					215					220						
acc	agc	gcc	gcc	gtc	ctg	gag	gcc	ctc	cgc	gag	gcc	cac	ccc	atc	gtg		720
Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val		
	225				230				235						240		
gag	aag	atc	ctg	cag	tac	cgg	gag	ctc	acc	aag	ctg	aag	agc	acc	tac		768
Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr		
			245					250						255			
att	gac	ccc	ttg	ccg	gac	ctc	atc	cac	ccc	agg	acg	ggc	cgc	ctc	cac		816
Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His		
		260						265					270				
acc	cgc	ttc	aac	cag	acg	gcc	acg	gcc	acg	ggc	agg	cta	agt	agc	tcc		864
Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser		
		275					280					285					
gat	ccc	aac	ctc	cag	aac	atc	ccc	gtc	cgc	acc	ccg	ctt	ggg	cag	agg		912
Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg		
	290					295					300						
atc	cgc	cgg	gcc	ttc	atc	gcc	gag	gag	ggg	tgg	cta	ttg	gtg	gcc	ctg		960
Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu		
	305				310				315						320		
gac	tat	agc	cag	ata	gag	ctc	agg	gtg	ctg	gcc	cac	ctc	tcc	ggc	gac		1008
Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp		
			325					330						335			
gag	aac	ctg	atc	cgg	gtc	ttc	cag	gag	ggg	cgg	gac	atc	cac	acg	gag		1056
Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Arg	Asp	Ile	His	Thr	Glu		
		340					345						350				
acc	gcc	agc	tgg	atg	ttc	ggc	gtc	ccc	cag	gag	gcc	gtg	gac	ccc	ctg		1104
Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Gln	Glu	Ala	Val	Asp	Pro	Leu		
		355					360					365					
atg	cgc	cgg	gcg	gcc	aag	acc	atc	aac	ttc	ggg	gtc	ctc	tac	ggc	atg		1152
Met	Arg	Arg	Ala	Ala	Lys	Thr	Ile	Asn	Phe	Gly	Val	Leu	Tyr	Gly	Met		
		370				375					380						
tcg	gcc	cac	cgc	ctc	tcc	cag	gag	cta	gcc	atc	cct	tac	gag	gag	gcc		1200
Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	Pro	Tyr	Glu	Glu	Ala		
					390					395					400		



cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	
450 455 460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc	1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe	
465 470 475 480	
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac	1488
Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp	
485 490 495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg	1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	
515 520 525	
gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg	1632
Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala	
530 535 540	
gcc gc	1637
Ala	
545	
<210> 85	
<211> 545	
<212> PRT	
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<400> 85	
Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala	
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp. Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Gln Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu

420

425

430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 86  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
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 <222> (1)..(1635)

<400> 86  
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 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96

Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Lys	Glu	Pro	Met	Trp	Ala	Asp	Leu	
		20						25					30			
ctg	gcc	ctg	gcc	gcc	gcc	agg	ggg	ggc	cgg	gtc	cac	cgg	gcc	ccc	gag	144
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu	
		35					40					45				
cct	tat	aaa	gcc	ctc	agg	gac	ctg	aag	gag	gcg	cgg	ggg	ctt	ctc	gcc	192
Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala	
	50					55					60					
aaa	gac	ctg	agc	gtt	ctg	gcc	ctg	agg	gaa	ggc	ctt	ggc	ctc	ccg	ccc	240
Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro	
65					70				75						80	
ggc	gac	gac	ccc	atg	ctc	ctc	gcc	tac	ctc	ctg	gac	cct	tcc	aac	acc	288
Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr	
				85					90					95		
acc	ccc	gag	ggg	gtg	gcc	cgg	cgc	tac	ggc	ggg	gag	tgg	acg	gag	gag	336
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu	
			100					105					110			
gcg	ggg	gag	cgg	gcc	gcc	ctt	tcc	gag	agg	ctc	ttc	gcc	aac	ctg	tgg	384
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp	
			115				120					125				
ggg	agg	ctt	gag	ggg	gag	gag	agg	ctc	ctt	tgg	ctt	tac	cgg	gag	gtg	432
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val	
	130						135					140				
gag	agg	ccc	ctt	tcc	gct	gtc	ctg	gcc	cac	atg	gag	gcc	acg	ggg	gtg	480
Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	
145					150					155					160	
cgc	ctg	gac	gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	528
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
				165					170					175		
gag	atc	gcc	cgc	ctc	gag	gcc	gag	gtc	ttc	cgc	ctg	gcc	ggc	cac	ccc	576
Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	
			180					185					190			
ttc	aac	ctc	aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	624
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	
		195					200					205				
cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	
	210					215					220					

acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg	720
Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val	
225 230 235 240	
 gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac	768
Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr	
245 250 255	
 att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac	816
Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His	
260 265 270	
 acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc	864
Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser	
275 280 285	
 gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg	912
Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg	
290 295 300	
 atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg	960
Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu	
305 310 315 320	
 gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac	1008
Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp	
325 330 335	
 gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag	1056
Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu	
340 345 350	
 acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg	1104
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
355 360 365	
 atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg	1152
Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
 tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc	1200
Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
385 390 395 400	
 cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala	
405 410 415	
 tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
420 425 430	

acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg 1344  
 Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

aag agc gtg cgg gag gcg gcc gag cgc aag gcc ttc aac atg ccc gtc 1392  
 Lys Ser Val Arg Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val  
 450 455 460

cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc 1440  
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac 1488  
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

gcc gc 1637  
 Ala  
 545

<210> 87  
 <211> 545  
 <212> PRT  
 <213> Thermus aquaticus

<400> 87

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30

Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr



245

250

255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Lys Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 88  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 88  
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 Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala 50 55 60	192
aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro 65 70 75 80	240
ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr 85 90 95	288
acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu 100 105 110	336
gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp 115 120 125	384
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val 130 135 140	432
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val 145 150 155 160	480
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu 165 170 175	528
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190	576
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205	624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768

att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335	1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala 385 390 395 400	1200
cag gcc ttc att gag cgc aac ttt cag agc ttc ccc aag gtg cgg gcc Gln Ala Phe Ile Glu Arg Asn Phe Gln Ser Phe Pro Lys Val Arg Ala 405 410 415	1248
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu 420 425 430	1296
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val 435 440 445	1344
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	1392

450 455 460

cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc 1440  
 Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac 1488  
 Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
 Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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gcc gc 1637  
 Ala  
 545

<210> 89  
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 <212> PRT  
 <213> Thermus aquaticus

<400> 89

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro

65		70		75		80
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr						
	85			90		95
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu						
	100			105		110
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp						
	115			120		125
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val						
	130			135		140
Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val						
	145			150		155
Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu						
	165			170		175
Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro						
	180			185		190
Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu						
	195			200		205
Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser						
	210			215		220
Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val						
	225			230		235
Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr						
	245			250		255
Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His						
	260			265		270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Asn Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
                     485                    490                    495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
                     500                    505                    510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
                     515                    520                    525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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Ala  
 545

<210> 90  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>  
 <221> CDS  
 <222> (1)..(1635)

<400> 90  
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 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
                     20                    25                    30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
                     35                    40                    45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
                     50                    55                    60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65                    70                    75                    80



ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc	288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr	
85 90 95	
acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag	336
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu	
100 105 110	
gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg	384
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp	
115 120 125	
ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg	432
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val	
130 135 140	
gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg	480
Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val	
145 150 155 160	
cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag	528
Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu	
165 170 175	
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc	576
Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro	
180 185 190	
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag	624
Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu	
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cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc	672
Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser	
210 215 220	
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg	720
Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val	
225 230 235 240	
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac	768
Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr	
245 250 255	
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac	816
Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His	
260 265 270	
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc	864
Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser	

275	280	285	
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gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335			1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350			1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365			1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380			1152
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cag gcc ttc att gag cgc tgc ttt cag agc ttc ccc aag gtg cgg gcc Gln Ala Phe Ile Glu Arg Cys Phe Gln Ser Phe Pro Lys Val Arg Ala 405 410 415			1248
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu 420 425 430			1296
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val 435 440 445			1344
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val 450 455 460			1392
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe 465 470 475 480			1440
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac			1488

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
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gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg 1536  
 Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
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ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg 1584  
 Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg 1632  
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 Ala  
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Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
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Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
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Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
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Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Cys Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
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Ala  
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 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
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 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80  
 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
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 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu

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ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val 130 135 140			432
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gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190			576
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cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220			672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240			720
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att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270			816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285			864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300			912
atc cgc cgg gcc ttc aac gcc gag gag ggg tgg cta ttg gtg gcc ctg			960

Ile Arg Arg Ala Phe Asn Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	
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gag aac ctg atc cgg gtc ttc cag gag ggg agg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala 385 390 395 400	1200
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala 405 410 415	1248
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu 420 425 430	1296
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val 435 440 445	1344
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val 450 455 460	1392
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe 465 470 475 480	1440
ccc agg ctg gag gaa atg ggg gcc agg atg ccc ctt cag gtc cac gac Pro Arg Leu Glu Glu Met Gly Ala Arg Met Pro Leu Gln Val His Asp 485 490 495	1488
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg 500 505 510	1536





Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
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Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
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Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
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Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
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Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
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Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Asn Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
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Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
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Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
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Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
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Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
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Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
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Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
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Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
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Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Pro Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
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Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

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Ala  
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 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
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cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
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aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag 336  
 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
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gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg 384  
 Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg 432

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Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val	
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cgc	ctg	gac	gtg	gcc	tat	ctc	agg	gcc	ttg	tcc	ctg	gag	gtg	gcc	gag	528
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu	
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Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro	
			180					185					190			
ttc	aac	ctc	aac	tcc	cgg	gac	cag	ctg	gaa	agg	gtc	ctc	ttt	gac	gag	624
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu	
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cta	ggg	ctt	ccc	gcc	atc	ggc	aag	acg	gag	aag	acc	ggc	aag	cgc	tcc	672
Leu	Gly	Leu	Pro	Ala	Ile	Gly	Lys	Thr	Glu	Lys	Thr	Gly	Lys	Arg	Ser	
	210					215					220					
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Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	Ala	His	Pro	Ile	Val	
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Glu	Lys	Ile	Leu	Gln	Tyr	Arg	Glu	Leu	Thr	Lys	Leu	Lys	Ser	Thr	Tyr	
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Ile	Asp	Pro	Leu	Pro	Asp	Leu	Ile	His	Pro	Arg	Thr	Gly	Arg	Leu	His	
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Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	Arg	Leu	Ser	Ser	Ser	
		275					280					285				
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Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	Pro	Leu	Gly	Gln	Arg	
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atc	cgc	cgg	gcc	ttc	atc	gcc	gag	gag	ggg	tgg	cta	ttg	gtg	gcc	ctg	960
Ile	Arg	Arg	Ala	Phe	Ile	Ala	Glu	Glu	Gly	Trp	Leu	Leu	Val	Ala	Leu	
305					310					315					320	
gac	tat	agc	cag	ata	gag	ctc	agg	gtg	ctg	gcc	cac	ctc	tcc	ggc	gac	1008
Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	His	Leu	Ser	Gly	Asp	
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Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu	
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acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg	1104
Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu	
355 360 365	
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Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met	
370 375 380	
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Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	
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cag gcc ttc att gag cgc tgc ttt cag agc ttc ccc aag gtg cgg gcc	1248
Gln Ala Phe Ile Glu Arg Cys Phe Gln Ser Phe Pro Lys Val Arg Ala	
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tgg,att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag	1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu	
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acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg	1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val	
435 440 445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc	1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val	
450 455 460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg gag ctc ttc	1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Glu Leu Phe	
465 470 475 480	
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac	1488
Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp	
485 490 495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg	1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg	
500 505 510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg	1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu	
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gcc gc  
Ala  
545

1637

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<400> 95

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Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro  
 180 185 190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu



355

360

365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Cys Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Glu Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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Ala  
 545

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 <212> DNA  
 <213> *Thermus aquaticus*

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 Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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 ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt 96  
 Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
 20 25 30  
 ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag 144  
 Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45  
 cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc 192  
 Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60  
 aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc 240  
 Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80  
 ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc 288  
 Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95  
 acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag 336  
 Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110  
 gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg 384  
 Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125  
 ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg 432  
 Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140  
 gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg 480  
 Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu 165 170 175	528
gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro 180 185 190	576
ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gaa Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205	624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768
att gac ccc ttg ccg ggc ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Gly Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960
gac tat agc cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335	1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104

atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala 385 390 395 400	1200
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala 405 410 415	1248
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu 420 425 430	1296
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val 435 440 445	1344
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val 450 455 460	1392
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe 465 470 475 480	1440
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag atc cac gac Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Ile His Asp 485 490 495	1488
gag ctg gtc ctc gag gcc cca aaa gag ggg gcg gag gcc gtg gcc cgg Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg 500 505 510	1536
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg ccc ctg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu 515 520 525	1584
gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala 530 535 540	1632
gcc gc Ala 545	1637

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 <213> Thermus aquaticus

<400> 97

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala  
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Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu  
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Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu  
 35 40 45

Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala  
 50 55 60

Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro  
 65 70 75 80

Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr  
 85 90 95

Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu  
 100 105 110

Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp  
 115 120 125

Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val  
 130 135 140

Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val  
 145 150 155 160

Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu  
 165 170 175

Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro

180

185

190

Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu  
 195 200 205

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Gly Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Ile His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro Leu  
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Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
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Ala  
 545

<210> 98  
 <211> 1637  
 <212> DNA  
 <213> Thermus aquaticus

<220>

&lt;221&gt; CDS

&lt;222&gt; (1)..(1635)

&lt;400&gt; 98

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ttc gtg ggc ttt gtg ctt tcc cgc aag gag ccc atg tgg gcc gat ctt      96
Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp Leu
20          25          30

ctg gcc ctg gcc gcc gcc agg ggg ggc cgg gtc cac cgg gcc ccc gag      144
Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro Glu
35          40          45

cct tat aaa gcc ctc agg gac ctg aag gag gcg cgg ggg ctt ctc gcc      192
Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu Ala
50          55          60

aaa gac ctg agc gtt ctg gcc ctg agg gaa ggc ctt ggc ctc ccg ccc      240
Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro Pro
65          70          75          80

ggc gac gac ccc atg ctc ctc gcc tac ctc ctg gac cct tcc aac acc      288
Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn Thr
85          90          95

acc ccc gag ggg gtg gcc cgg cgc tac ggc ggg gag tgg acg gag gag      336
Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu Glu
100          105          110

gcg ggg gag cgg gcc gcc ctt tcc gag agg ctc ttc gcc aac ctg tgg      384
Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu Trp
115          120          125

ggg agg ctt gag ggg gag gag agg ctc ctt tgg ctt tac cgg gag gtg      432
Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu Val
130          135          140

gag agg ccc ctt tcc gct gtc ctg gcc cac atg gag gcc acg ggg gtg      480
Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly Val
145          150          155          160

cgc ctg gac gtg gcc tat ctc agg gcc ttg tcc ctg gag gtg gcc gag      528
Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala Glu
165          170          175

gag atc gcc cgc ctc gag gcc gag gtc ttc cgc ctg gcc ggc cac ccc      576
Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His Pro
180          185          190

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ttc aac ctc aac tcc cgg gac cag ctg gaa agg gtc ctc ttt gac gag Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp Glu 195 200 205	624
cta ggg ctt ccc gcc atc ggc aag acg gag aag acc ggc aag cgc tcc Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser 210 215 220	672
acc agc gcc gcc gtc ctg gag gcc ctc cgc gag gcc cac ccc atc gtg Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val 225 230 235 240	720
gag aag atc ctg cag tac cgg gag ctc acc aag ctg aag agc acc tac Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr 245 250 255	768
att gac ccc ttg ccg gac ctc atc cac ccc agg acg ggc cgc ctc cac Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His 260 265 270	816
acc cgc ttc aac cag acg gcc acg gcc acg ggc agg cta agt agc tcc Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser 275 280 285	864
gat ccc aac ctc cag aac atc ccc gtc cgc acc ccg ctt ggg cag agg Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg 290 295 300	912
atc cgc cgg gcc ttc atc gcc gag gag ggg tgg cta ttg gtg gcc ctg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu 305 310 315 320	960
gac tat aac cag ata gag ctc agg gtg ctg gcc cac ctc tcc ggc gac Asp Tyr Asn Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp 325 330 335	1008
gag aac ctg atc cgg gtc ttc cag gag ggg cgg gac atc cac acg gag Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu 340 345 350	1056
acc gcc agc tgg atg ttc ggc gtc ccc cgg gag gcc gtg gac ccc ctg Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu 355 360 365	1104
atg cgc cgg gcg gcc aag acc atc aac ttc ggg gtc ctc tac ggc atg Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met 370 375 380	1152
tcg gcc cac cgc ctc tcc cag gag cta gcc atc cct tac gag gag gcc Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala	1200

385	390	395	400	
cag gcc ttc att gag cgc tac ttt cag agc ttc ccc aag gtg cgg gcc				1248
Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala				
	405	410	415	
tgg att gag aag acc ctg gag gag ggc agg agg cgg ggg tac gtg gag				1296
Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu				
	420	425	430	
acc ctc ttc ggc cgc cgc cgc tac gtg cca gac cta gag gcc cgg gtg				1344
Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val				
	435	440	445	
aag agc gtg cgg gag gcg gcc gag cgc atg gcc ttc aac atg ccc gtc				1392
Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val				
	450	455	460	
cag ggc acc gcc gcc gac ctc atg aag ctg gct atg gtg aag ctc ttc				1440
Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe				
	465	470	475	480
ccc agg ctg gag gaa atg ggg gcc agg atg ctc ctt cag gtc cac gac				1488
Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp				
	485	490	495	
gag ctg gtc ctc gag gcc cca aaa gag ggg gcc gag gcc gtg gcc cgg				1536
Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg				
	500	505	510	
ctg gcc aag gag gtc atg gag ggg gtg tat ccc ctg gcc gtg tcc ctg				1584
Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Ser Leu				
	515	520	525	
gag gtg gag gtg ggg ata ggg gag gac tgg ctc tcc gcc aag gag gcg				1632
Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala				
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gcc gc				1637
Ala				
545				

<210> 99  
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 <212> PRT  
 <213> Thermus aquaticus

<400> 99

Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly Ala

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		20						25					30		
Leu	Ala	Leu	Ala	Ala	Ala	Arg	Gly	Gly	Arg	Val	His	Arg	Ala	Pro	Glu
		35					40					45			
Pro	Tyr	Lys	Ala	Leu	Arg	Asp	Leu	Lys	Glu	Ala	Arg	Gly	Leu	Leu	Ala
	50					55					60				
Lys	Asp	Leu	Ser	Val	Leu	Ala	Leu	Arg	Glu	Gly	Leu	Gly	Leu	Pro	Pro
65					70					75					80
Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	Asp	Pro	Ser	Asn	Thr
				85					90					95	
Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	Glu	Trp	Thr	Glu	Glu
			100					105						110	
Ala	Gly	Glu	Arg	Ala	Ala	Leu	Ser	Glu	Arg	Leu	Phe	Ala	Asn	Leu	Trp
		115					120					125			
Gly	Arg	Leu	Glu	Gly	Glu	Glu	Arg	Leu	Leu	Trp	Leu	Tyr	Arg	Glu	Val
	130					135					140				
Glu	Arg	Pro	Leu	Ser	Ala	Val	Leu	Ala	His	Met	Glu	Ala	Thr	Gly	Val
145					150					155					160
Arg	Leu	Asp	Val	Ala	Tyr	Leu	Arg	Ala	Leu	Ser	Leu	Glu	Val	Ala	Glu
				165					170					175	
Glu	Ile	Ala	Arg	Leu	Glu	Ala	Glu	Val	Phe	Arg	Leu	Ala	Gly	His	Pro
			180					185					190		
Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	Val	Leu	Phe	Asp	Glu
		195					200					205			

Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg Ser  
 210 215 220

Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile Val  
 225 230 235 240

Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr Tyr  
 245 250 255

Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu His  
 260 265 270

Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser Ser  
 275 280 285

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln Arg  
 290 295 300

Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala Leu  
 305 310 315 320

Asp Tyr Asn Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly Asp  
 325 330 335

Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr Glu  
 340 345 350

Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro Leu  
 355 360 365

Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly Met  
 370 375 380

Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu Ala  
 385 390 395 400

Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg Ala  
 405 410 415

Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val Glu  
 420 425 430

Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg Val  
 435 440 445

Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro Val  
 450 455 460

Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu Phe  
 465 470 475 480

Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His Asp  
 485 490 495

Glu Leu Val Leu Glu Ala Pro Lys Glu Gly Ala Glu Ala Val Ala Arg  
 500 505 510

Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Ser Leu  
 515 520 525

Glu Val Glu Val Gly Ile Gly Glu Asp Trp Leu Ser Ala Lys Glu Ala  
 530 535 540

Ala  
 545

<210> 100  
 <211> 832  
 <212> PRT  
 <213> Thermus aquaticus

<400> 100

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Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly Phe Ala  
 35 40 45

Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Asp Ala Val Ile Val  
 50 55 60

Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala Tyr Gly Gly  
 65 70 75 80

Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro Arg Gln Leu  
 85 90 95

Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Leu Ala Arg Leu Glu  
 100 105 110

Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Ser Leu Ala Lys Lys  
 115 120 125

Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala Asp Lys Asp  
 130 135 140

Leu Tyr Gln Leu Leu Ser Asp Arg Ile His Val Leu His Pro Glu Gly  
 145 150 155 160

Tyr Leu Ile Thr Pro Ala Trp Leu Trp Glu Lys Tyr Gly Leu Arg Pro  
 165 170 175

Asp Gln Trp Ala Asp Tyr Arg Ala Leu Thr Gly Asp Glu Ser Asp Asn  
 180 185 190

Leu Pro Gly Val Lys Gly Ile Gly Glu Lys Thr Ala Arg Lys Leu Leu  
 195 200 205

Glu Glu Trp Gly Ser Leu Glu Ala Leu Leu Lys Asn Leu Asp Arg Leu  
 210 215 220

Lys Pro Ala Ile Arg Glu Lys Ile Leu Ala His Met Asp Asp Leu Lys  
 225 230 235 240

Leu Ser Trp Asp Leu Ala Lys Val Arg Thr Asp Leu Pro Leu Glu Val  
 245 250 255

Asp Phe Ala Lys Arg Arg Glu Pro Asp Arg Glu Arg Leu Arg Ala Phe  
 260 265 270

Leu Glu Arg Leu Glu Phe Gly Ser Leu Leu His Glu Phe Gly Leu Leu  
 275 280 285

Glu Ser Pro Lys Ala Leu Glu Glu Ala Pro Trp Pro Pro Pro Glu Gly  
 290 295 300

Ala Phe Val Gly Phe Val Leu Ser Arg Lys Glu Pro Met Trp Ala Asp  
 305 310 315 320

Leu Leu Ala Leu Ala Ala Ala Arg Gly Gly Arg Val His Arg Ala Pro  
 325 330 335

Glu Pro Tyr Lys Ala Leu Arg Asp Leu Lys Glu Ala Arg Gly Leu Leu  
 340 345 350

Ala Lys Asp Leu Ser Val Leu Ala Leu Arg Glu Gly Leu Gly Leu Pro  
 355 360 365

Pro Gly Asp Asp Pro Met Leu Leu Ala Tyr Leu Leu Asp Pro Ser Asn  
 370 375 380

Thr Thr Pro Glu Gly Val Ala Arg Arg Tyr Gly Gly Glu Trp Thr Glu  
 385 390 395 400

Glu Ala Gly Glu Arg Ala Ala Leu Ser Glu Arg Leu Phe Ala Asn Leu  
 405 410 415

Trp Gly Arg Leu Glu Gly Glu Glu Arg Leu Leu Trp Leu Tyr Arg Glu  
 420 425 430

Val Glu Arg Pro Leu Ser Ala Val Leu Ala His Met Glu Ala Thr Gly

435

440

445

Val Arg Leu Asp Val Ala Tyr Leu Arg Ala Leu Ser Leu Glu Val Ala  
 450 455 460

Glu Glu Ile Ala Arg Leu Glu Ala Glu Val Phe Arg Leu Ala Gly His  
 465 470 475 480

Pro Phe Asn Leu Asn Ser Arg Asp Gln Leu Glu Arg Val Leu Phe Asp  
 485 490 495

Glu Leu Gly Leu Pro Ala Ile Gly Lys Thr Glu Lys Thr Gly Lys Arg  
 500 505 510

Ser Thr Ser Ala Ala Val Leu Glu Ala Leu Arg Glu Ala His Pro Ile  
 515 520 525

Val Glu Lys Ile Leu Gln Tyr Arg Glu Leu Thr Lys Leu Lys Ser Thr  
 530 535 540

Tyr Ile Asp Pro Leu Pro Asp Leu Ile His Pro Arg Thr Gly Arg Leu  
 545 550 555 560

His Thr Arg Phe Asn Gln Thr Ala Thr Ala Thr Gly Arg Leu Ser Ser  
 565 570 575

Ser Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Thr Pro Leu Gly Gln  
 580 585 590

Arg Ile Arg Arg Ala Phe Ile Ala Glu Glu Gly Trp Leu Leu Val Ala  
 595 600 605

Leu Asp Tyr Ser Gln Ile Glu Leu Arg Val Leu Ala His Leu Ser Gly  
 610 615 620

Asp Glu Asn Leu Ile Arg Val Phe Gln Glu Gly Arg Asp Ile His Thr  
 625 630 635 640



Glu Thr Ala Ser Trp Met Phe Gly Val Pro Arg Glu Ala Val Asp Pro  
645 650 655

Leu Met Arg Arg Ala Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly  
660 665 670

Met Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile Pro Tyr Glu Glu  
675 680 685

Ala Gln Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe Pro Lys Val Arg  
690 695 700

Ala Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Arg Arg Gly Tyr Val  
705 710 715 720

Glu Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp Leu Glu Ala Arg  
725 730 735

Val Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala Phe Asn Met Pro  
740 745 750

Val Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala Met Val Lys Leu  
755 760 765

Phe Pro Arg Leu Glu Glu Met Gly Ala Arg Met Leu Leu Gln Val His  
770 775 780

Asp Glu Leu Val Leu Glu Ala Pro Lys Glu Arg Ala Glu Ala Val Ala  
785 790 795 800

Arg Leu Ala Lys Glu Val Met Glu Gly Val Tyr Pro Leu Ala Val Pro  
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